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ARGONNE NATIONAL LABORATORY
Idaho Division

Report of

EBR-II OPERATING DATA

April 1, 1966 through June 30, 1966

Argonne National Laboratory

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From: L. P. Barnes *LPB* EBR-II Engineering Staff
Subject: EBR-II Operating Data Report

The report of EBR-II operating data for the period April 1 through June 30, 1966, is attached. This report continues the last data report issued May 13, 1966.

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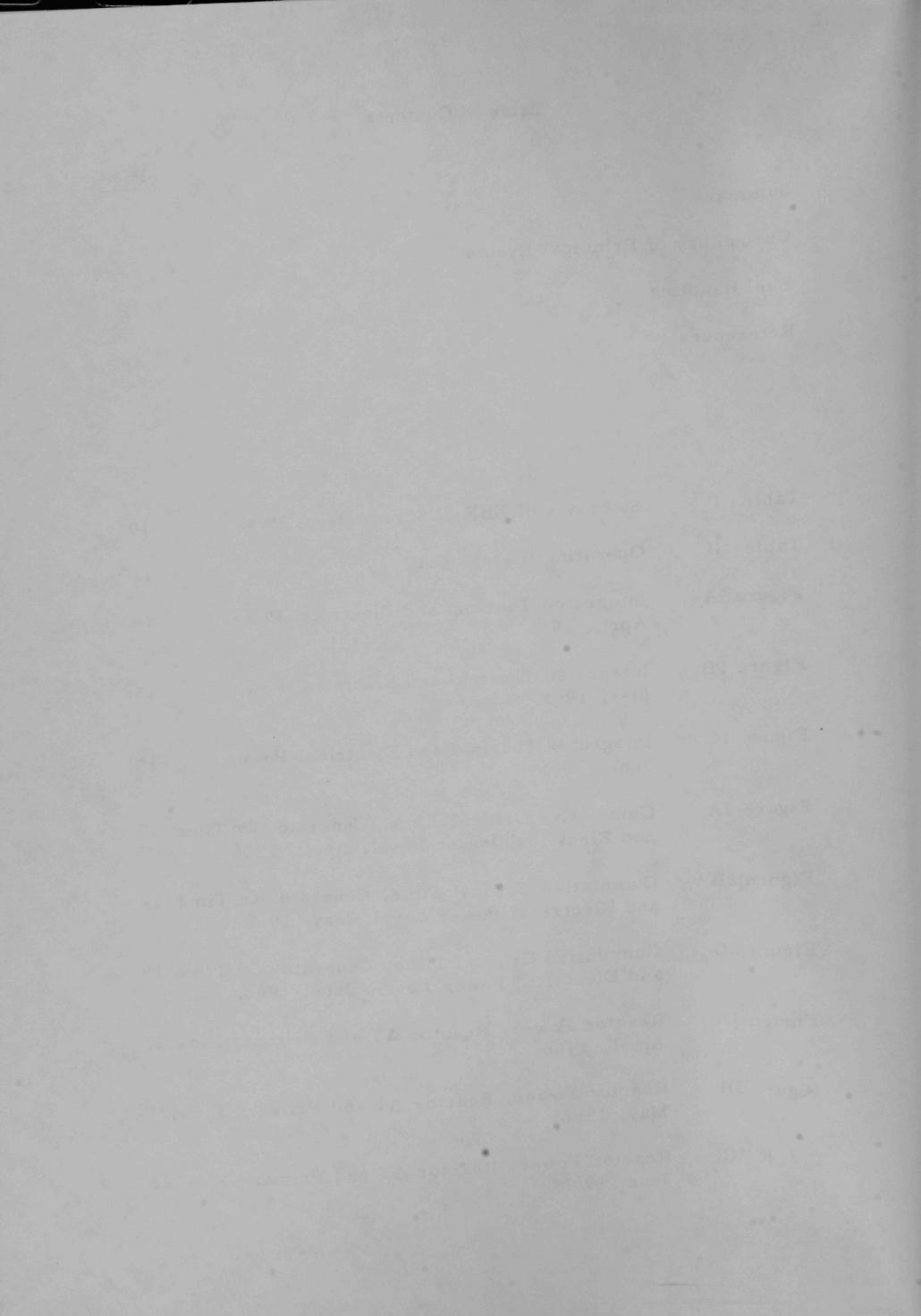


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The following tests of the system were also accomplished:

1. Control rod drop tests at various conditions were performed for moderate heat flux.
2. Rod drop tests at 2000 and 3000 rpm were performed for a range of the system feedback control settings.
3. The sodium-generating pneumatic transfer system was tested at a rate of 1 kg/sec at 1000 rpm.
4. Pulse tests were conducted at 10 KVA to determine the effect of the fast reactor neutron dose on the primary gas volume.
5. The auxiliary primary sodium pump motor was tested for 4 hours to determine its dynamic characteristics and the motor efficiency.
6. Three tubes-of-passing water tests at the secondary heat power were performed to determine the rate of temperature rise in the primary piping.
7. The sodium cooling system's protection capability was checked with 100% full reactor power.
8. Over-speed test on the slow sodium-pump sodium pump motor settings.
9. Simulated emergency procedures were carried out by training Reactor Protection System technicians for the resulting and resulting protective measures. Major conclusions included the following:

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10. *Notes on the History of the Chinese in California* by Dr. George F. Hart, San Francisco, Calif., 1908.

Summary

Power runs Nos. 15 through 19 were completed during this report period. The incremental burnup for the calendar quarter was 2796 MWd for a total of 8571 MWd since the approach to power. The corresponding electrical power production was 817 MWd for a total of 2403 MWd. The reactor was critical for 1658 hours during this period and the generator was on the line for 1432 hours. Nine experimental subassemblies were in the reactor (5 in core, 4 in inner blanket) during power runs 15 and 16. Experimental subassembly number XO11 was installed in the core prior to run 17, making a total of 10 experimental subassemblies in the reactor during runs 17, 18, and 19.

The following tests or major work items were accomplished:

1. Control rod calibrations and power coefficient measurements were obtained for each core loading.
2. Rod drop tests at 45 MW and 500 KW were performed for evaluation of the system feedback characteristics.
3. The turbine-generator automatic transfer system was tested at power levels of 25 and 45 MWT.
4. Bare pin tests were conducted at 10 MWT to determine response of the fuel element rupture detector and fission gas monitor.
5. The auxiliary primary sodium pump battery was load tested for 40 minutes to determine its discharge characteristics and the resultant primary sodium flow.
6. Three (3) loss-of-cooling water tests to the secondary EM pump were performed to determine the rate of temperature rise in the pump windings.
7. The shutdown cooler system heat rejection capability was checked with 700° F bulk sodium temperature.
8. Overspeed trip tests on the main turbine-generator showed satisfactory trip settings.
9. Simulated plant evacuation procedures were carried out for training.

Reactor shutdown periods were utilized primarily for fuel handling and routine preventive maintenance. Major work items included the following:

Summary (Continued)

1. The new equipment airlock door (reactor side) was installed and satisfactorily leak tested.
2. The annual leak rate test of personnel airlock doors was successfully completed.
3. The final heater element was installed in primary tank heater nozzle W-4.
4. A steam leak in a flange connection of a feedwater heater was repaired.

At the end of the report period, the reactor was shut down awaiting results of the examination of additional Mark 1A subassemblies which had reached burnup levels of about 1.2 a/o.

Chronology of Principal Events

<u>Date</u>	<u>Event</u>														
4/1/66	<p>Plant Status:</p> <table> <tr> <td>Power Run No. 15 in progress at 45 MWt.</td> <td></td> </tr> <tr> <td>Primary Sodium Temperature</td> <td>700°F</td> </tr> <tr> <td>Primary Flow</td> <td>100%</td> </tr> <tr> <td>Secondary Sodium Flow</td> <td>76%</td> </tr> <tr> <td>Reactor ΔT</td> <td>133°F</td> </tr> <tr> <td>Steam Pressure</td> <td>1250 psig</td> </tr> <tr> <td>Electrical Heat Input (Primary)</td> <td>0 KW</td> </tr> </table>	Power Run No. 15 in progress at 45 MWt.		Primary Sodium Temperature	700°F	Primary Flow	100%	Secondary Sodium Flow	76%	Reactor ΔT	133°F	Steam Pressure	1250 psig	Electrical Heat Input (Primary)	0 KW
Power Run No. 15 in progress at 45 MWt.															
Primary Sodium Temperature	700°F														
Primary Flow	100%														
Secondary Sodium Flow	76%														
Reactor ΔT	133°F														
Steam Pressure	1250 psig														
Electrical Heat Input (Primary)	0 KW														
3/26 to 4/14	Power Run No. 15 accumulated 795 MWd(t) for a total of 6365 MWd(t). Electrical power production was 234 MWd for a total of 1763 MWd.														
4/4	Heater No. 47 was installed in primary tank heater nozzle W-4, making full heater capacity available.														
4/7 to 4/8	Alpha measurement subassemblies C220X, C221X to FCF.														
4/11	Experimental subassembly XA01 to FCF.														
4/17	Reactor grid loading change for Run No. 16 completed - 19 subassemblies removed, 17 new or reprocessed subassemblies installed. No experiments available.														
4/17	Achieved criticality with Run No. 16 loading. Shut down reactor and removed one 6th row subassembly to reduce excess reactivity to desired value.														
4/18	Control rod calibrations and power coefficient measurements were obtained at beginning of Run No. 16.														
4/18 to 5/8	Run No. 16 accumulated 775 MWdt (234 MWde) for a total of 7140 MWdt (1996 MWde).														
4/20	Reactor scram caused by loss of secondary sodium flow. Two diodes in the secondary pump control circuit failed which resulted in a step reduction of generator excitation.														
4/26	Severe voltage and frequency variation on 138 KV system caused reactor scram and generator trip.														
4/28	Completed installation of new door on reactor side of equipment airlock. Satisfactory leak rate test performed.														

Chronology of Principal Events (Continued)

- 4/30 Reactor shut down for repair of steam leak in a flange connection on feedwater heater.
- 5/3 Performed a series of rod drop tests at 45 MW and 500 KW for evaluation of system feedback characteristics.
- 5/6 Satisfactory tests of the automatic transfer system for the main turbine generator were conducted at power levels of 25 and 45 MWt.
- 5/7 Experimental subassembly X011 installed in Storage Basket.
- 5/9 Movies were taken during fuel handling operations. This film will be a part of the training film being prepared by the EBR-II Training Group and the ANL Motion Picture Unit.
- Annual leak rate test of personnel airlock doors successfully completed.
- 5/11 and 5/12 "Bare pin test" performed for calibration of fuel element rupture monitors. A modified control rod with one unclad fuel pin was installed in place of normal control rod in position No. 8 and reactor was operated at 10 MWt. Responses of fuel element rupture detector and fission gas monitor were satisfactory.
- A battery load test was conducted on the auxiliary primary sodium pump to determine the discharge characteristics of the battery. Measured flow rate and discharge current versus time were satisfactory.
- 5/13 Reactor grid loading changes for Run No. 17 completed - 5 subassemblies removed, 5 new or reprocessed subassemblies installed. Experimental subassembly X011 installed.
- 5/13 to 5/23 Power Run No. 17 accumulated 455 MWdt (136 MWde) for a total of 7595 MWdt (2132 MWde).
- 5/26 Reactor grid loading changes for Run No. 18 completed - 11 subassemblies removed, 11 new or reprocessed subassemblies installed. No experiments available.

Chronology of Principal Events (Continued)

- 5/26 to 6/14 Power Run No. 18 accumulated 875 MWdt (270 MWde) for a total of 8490 MWdt (2403 MWde). This run achieved 1.2 a/o burnup on a selected Mark 1A driver fuel subassembly which was removed for inspection.
- 6/7 A severe voltage fluctuation on the 138 KV system caused reactor scram.
- 6/13 A test of the shutdown cooler system was conducted to determine the heat rejection capability with 700°F bulk sodium temperature.
- 6/21 Reactor grid loading changes for Run No. 19 completed - 14 subassemblies removed, 12 new or reprocessed subassemblies installed. No experiments available.
- 6/23 and 6/29 Conducted loss of cooling water tests on secondary sodium EM pump.
- 6/24 Main turbine-generator overspeed tests conducted. Turbine trip settings were satisfactory. On third run, a loud internal "clank" occurred in generator. Machine will be disassembled to determine cause.
- 6/25 Conducted a simulated plant evacuation for training.
- 6/27 Start Power Run No. 19.
- 6/29 Terminated Run No. 19 after 78 MWdt (total integrated power 8568 MWdt). Surveillance data of Mark 1A subassemblies C-169 and C-185 indicates the sodium bond height was approaching the calculated limit. Additional core subassemblies will be removed for examination.
- 6/30/66 Plant Status:
Plant shut down awaiting fuel surveillance data.
Primary Sodium Temperature 697°F
Secondary Sodium Flow 0.2%
Steam Pressure 1180 psig
Primary Tank Heat Input 240 KW
Fuel handling in progress.

Fuel Handling

The surveillance program for the Mark 1A fuel was extended to 1.2 atom percent maximum burnup during this quarter. A summary of the subassemblies removed for fuel surveillance examination is given immediately below.

<u>Reactor Power Run</u>	<u>Subassembly Removed for Surveillance</u>	<u>MWd</u>	<u>Actual Max. Burnup</u>
16	C165	7140	0.58
17	C166	7615	0.95
18	C180	8490	0.82
19	C175 C179 C186	8980 8980 8980	1.22 1.22 1.09

Preliminary examination of the Mark 1A fuel alloy indicates a possible limitation of 1.2 atom percent burnup.

Experimental subassembly X011 was installed in the reactor grid in grid position 2F1, prior to reactor run 17. The last core-type alpha-measurement subassembly C222X was removed from the reactor following Run 17.

The alpha measurement subassemblies C220X, C221X, C222X and one experimental subassembly, XA01, were transferred to the Fuel Cycle Facility during this quarter.

A total of 41 spent subassemblies were transferred to the Fuel Cycle Facility for disassembly and reprocessing with the exception of the experimental subassemblies and surveillance subassemblies mentioned previously. A total of 48 reprocessed subassemblies were received from the Fuel Cycle Facility.

Four major changes in the reactor grid loading were made during this quarter for reactor power Runs No. 16, 17, 18, and 19. A summary of the condition of the core is given below.

<u>Reactor Power Run</u>	<u>Core Size</u>	<u>Experimental Irradiation Subassemblies</u>
16	77 Subassemblies	5 in core, 4 in inner blanket
17	77 Subassemblies	6 in core, 4 in inner blanket
18	74 Subassemblies	6 in core, 4 in inner blanket
19	74 Subassemblies	6 in core, 4 in inner blanket

A tabular summary of the fuel handling operations performed during this quarter follows.

Fuel Handling
April 1, 1966 to June 30, 1966

Spent Subassemblies Transferred to FCF

Reprocessed Subassemblies
Received from FCF

Subassy. No.	Grid Position	Maximum Burnup	Date	Subassy. No.	Date
B308	6D3	1..18	4-6-66	B334	4-30-66
B309	6A3	1.15	5-27-66	B338	5-17-66
C123	4D2	1.21	5-9-66	B339	5-18-66
C130	4C1	1.21	5-10-66	B340	4-12-66
C156	2F1	1.09	6-2-66	B342	5-10-66
C157	5D2	1.02	4-4-66	B343	5-20-66
C159	4B2	1.12	6-9-66	B344	4-27-66
C160	3F1	1.08	4-5-66	B345	4-28-66
C164	4A3	1.21	6-13-66	B346	5-11-66
*C165	4B3	.58	5-6-66	C196	4-1-66
C166	3F2	.94	5-20-66	C197	4-2-66
C167	4F3	1.03	4-2-66	C198	4-4-66
C168	2D1	1.03	4-1-66	C199	4-5-66
*C169	1A1	1.22	6-27-66	C213	4-6-66
C172	4A2	1.06	6-3-66	C214	4-12-66
C173	4B1	1.21	5-11-66	C216	4-7-66
C174	2E1	1.13	5-13-66	C217	4-8-66
C176	4E1	1.21	5-16-66	C218	4-11-66
C177	5C2	1.11	5-17-66	C224	4-13-66
C178	5G4	1.11	5-18-66	C225	4-13-66
*C180	3A2	.81	5-31-66	C227	4-26-66
C185	3F1	1.12	6-24-66	C228	4-29-66
C191	2A1	1.15	5-4-66	C229	5-2-66
C194	2B1	1.15	5-19-66	C230	5-3-66
C200	4D1	1.14	6-28-66	C231	5-4-66
C201	3B1	1.09	5-24-66	C232	5-6-66
C202	3C2	1.12	6-1-66	C233	5-6-66
C204	3F1	1.09	5-25-66	C234	5-12-66
C205	3E2	1.11	5-26-66	C235	5-13-66
C206	4E3	1.21	6-14-66	C236	5-16-66
C212	4F1	1.05	6-29-66	C237	5-19-66
C220X	1A1	1.18	4-7-66	C238	5-24-66
C221X	3B2	1.23	4-8-66	C239	5-25-66
C222X	5B4	1.22	6-30-66	C240	5-26-66
L402	5E3	1.13	5-5-66	C241	5-27-66
L404	5B3	1.2	4-22-66	C242	5-31-66
L416	5A3	1.21	6-6-66	C243	6-2-66
L419	5F3	1.15	6-7-66	C244	6-3-66
L420	5D3	1.15	6-8-66	C245	6-10-66
S600	3D1	1.08	4-25-66	C246	6-13-66
XA01	6D2	.53	4-11-66	C247	6-14-66

Fuel Handling (Continued)

 Reprocessed Subassemblies
 Received from FCF

Subassy. No.	Date
L429	4-12-66
L430	5-23-66
L431	5-23-66
L432	4-14-66
L434	6-4-66
L436	6-7-66
S610	6-23-66

Loading Changes for
Reactor Power Run 16

Subassy. No.	From	To	Maximum Burnup	Subassy. No.	From	To	Maximum Burnup
C191	2A1		1.15	C217		4D2	
C188		2A1		C176	4E1		1.21
C194	2B1		1.15	C218		4E1	
C189		2B1		C177	5C2		1.11
C174	2E1		1.13	C214		5C2	
C190		2E1		C178	5C4		1.11
C201	3B1		1.09	C224		5C4	
C196		3B1		B309	6A3		1.15
C202	3C2		1.12	B331		6A3	
C197		3C2		B320	6D5		.77
C205	3E2		1.11	A724		6D5	
C198		3E2		L402	5E3		1.12
C173	4B1		1.21	L428		5E3	
C199		4B1		C204	3E1		1.09
C165	4B3		.58	C225		3E1	
C213		4B3		S611	3A1		1.21
C130	4C1		1.21	S603		3A1	
C216		4C1		B315	6B2		.97
C123	4D2		1.21	A713		6B2	

Loading Changes for
Reactor Power Run 17

Subassy. No.	<u>From</u>	<u>To</u>	Maximum Burnup	Subassy. No.	<u>From</u>	<u>To</u>	Maximum Burnup
C156	2F1		1.09	B332		6E4	
XO11		2F1		A743	6A2		
C166	3F2		.94	B318		6A2	
C231		3F2		L418X	5A3		
L416	5A3		1.21	L429		5A3	
L418X		5A3		A724	6D5		
B321	6E4		1.12	B320		6D5	

Loading Changes for
Reactor Power Run 18

Subassy. No.	<u>From</u>	<u>To</u>	Maximum Burnup	Subassy. No.	<u>From</u>	<u>To</u>	Maximum Burnup
C180	3A2		.82	C233		4F1	
C227		3A2		C222X	5B4		1.22
C164	4A3		1.22	C234		5B4	
C228		4A3		B310	6F5		1.15
C159	4B2		1.12	A719		6F5	
C229		4B2		L420	5D3		1.06
C170	4C3		1.22	L430		5D3	
C230		4C3		L419	5F3		1.15
C200	4D1		1.14	L431		5F3	
C232		4D1		C206	4E3		1.22
C212	4F1		1.05	C235		4E3	

Loading Changes for
Reactor Power Run 19

Subassy. No.	<u>From</u>	<u>To</u>	Maximum Burnup	Subassy. No.	<u>From</u>	<u>To</u>	Maximum Burnup
C193	5F2		1.21	C245		5A4	
C244		5F2		C155	4A1		1.18
C207	5A2		1.21	C241		4A1	
C238		5A2		C161	5B2		1.08
C209	5D4		1.21	C247		5B2	
C236		5D4		C169	1A1		1.22
C211	5E2		1.21	C237		1A1	
C243		5E2		C185	3F1		1.12
C210	5E4		1.21	C242		3F1	
C239		5E4		B320	6D5		1.08
C154	5F4		1.21	A724		6D5	
C240		5F4		L422	5C3		1.09
C208	5A4		1.21	L436		5C3	

B 326 bC5

A 774

bC5

Sample	Sex	Age	Weight (kg)	Length (cm)	Width (cm)	Thickness (mm)	Color	Condition	Notes
1	M	Adult	15	100	15	1.5	Grey	Good	
2	M	Adult	18	105	16	1.6	Grey	Good	
3	M	Adult	20	110	17	1.7	Grey	Good	
4	M	Adult	22	115	18	1.8	Grey	Good	
5	M	Adult	24	120	19	1.9	Grey	Good	
6	M	Adult	26	125	20	2.0	Grey	Good	
7	M	Adult	28	130	21	2.1	Grey	Good	
8	M	Adult	30	135	22	2.2	Grey	Good	
9	M	Adult	32	140	23	2.3	Grey	Good	
10	M	Adult	34	145	24	2.4	Grey	Good	
11	M	Adult	36	150	25	2.5	Grey	Good	
12	M	Adult	38	155	26	2.6	Grey	Good	
13	M	Adult	40	160	27	2.7	Grey	Good	
14	M	Adult	42	165	28	2.8	Grey	Good	
15	M	Adult	44	170	29	2.9	Grey	Good	
16	M	Adult	46	175	30	3.0	Grey	Good	
17	M	Adult	48	180	31	3.1	Grey	Good	
18	M	Adult	50	185	32	3.2	Grey	Good	
19	M	Adult	52	190	33	3.3	Grey	Good	
20	M	Adult	54	195	34	3.4	Grey	Good	
21	M	Adult	56	200	35	3.5	Grey	Good	
22	M	Adult	58	205	36	3.6	Grey	Good	
23	M	Adult	60	210	37	3.7	Grey	Good	
24	M	Adult	62	215	38	3.8	Grey	Good	
25	M	Adult	64	220	39	3.9	Grey	Good	
26	M	Adult	66	225	40	4.0	Grey	Good	
27	M	Adult	68	230	41	4.1	Grey	Good	
28	M	Adult	70	235	42	4.2	Grey	Good	
29	M	Adult	72	240	43	4.3	Grey	Good	
30	M	Adult	74	245	44	4.4	Grey	Good	
31	M	Adult	76	250	45	4.5	Grey	Good	
32	M	Adult	78	255	46	4.6	Grey	Good	
33	M	Adult	80	260	47	4.7	Grey	Good	
34	M	Adult	82	265	48	4.8	Grey	Good	
35	M	Adult	84	270	49	4.9	Grey	Good	
36	M	Adult	86	275	50	5.0	Grey	Good	
37	M	Adult	88	280	51	5.1	Grey	Good	
38	M	Adult	90	285	52	5.2	Grey	Good	
39	M	Adult	92	290	53	5.3	Grey	Good	
40	M	Adult	94	295	54	5.4	Grey	Good	
41	M	Adult	96	300	55	5.5	Grey	Good	
42	M	Adult	98	305	56	5.6	Grey	Good	
43	M	Adult	100	310	57	5.7	Grey	Good	
44	M	Adult	102	315	58	5.8	Grey	Good	
45	M	Adult	104	320	59	5.9	Grey	Good	
46	M	Adult	106	325	60	6.0	Grey	Good	
47	M	Adult	108	330	61	6.1	Grey	Good	
48	M	Adult	110	335	62	6.2	Grey	Good	
49	M	Adult	112	340	63	6.3	Grey	Good	
50	M	Adult	114	345	64	6.4	Grey	Good	
51	M	Adult	116	350	65	6.5	Grey	Good	
52	M	Adult	118	355	66	6.6	Grey	Good	
53	M	Adult	120	360	67	6.7	Grey	Good	
54	M	Adult	122	365	68	6.8	Grey	Good	
55	M	Adult	124	370	69	6.9	Grey	Good	
56	M	Adult	126	375	70	7.0	Grey	Good	
57	M	Adult	128	380	71	7.1	Grey	Good	
58	M	Adult	130	385	72	7.2	Grey	Good	
59	M	Adult	132	390	73	7.3	Grey	Good	
60	M	Adult	134	395	74	7.4	Grey	Good	
61	M	Adult	136	400	75	7.5	Grey	Good	
62	M	Adult	138	405	76	7.6	Grey	Good	
63	M	Adult	140	410	77	7.7	Grey	Good	
64	M	Adult	142	415	78	7.8	Grey	Good	
65	M	Adult	144	420	79	7.9	Grey	Good	
66	M	Adult	146	425	80	8.0	Grey	Good	
67	M	Adult	148	430	81	8.1	Grey	Good	
68	M	Adult	150	435	82	8.2	Grey	Good	
69	M	Adult	152	440	83	8.3	Grey	Good	
70	M	Adult	154	445	84	8.4	Grey	Good	
71	M	Adult	156	450	85	8.5	Grey	Good	
72	M	Adult	158	455	86	8.6	Grey	Good	
73	M	Adult	160	460	87	8.7	Grey	Good	
74	M	Adult	162	465	88	8.8	Grey	Good	
75	M	Adult	164	470	89	8.9	Grey	Good	
76	M	Adult	166	475	90	9.0	Grey	Good	
77	M	Adult	168	480	91	9.1	Grey	Good	
78	M	Adult	170	485	92	9.2	Grey	Good	
79	M	Adult	172	490	93	9.3	Grey	Good	
80	M	Adult	174	495	94	9.4	Grey	Good	
81	M	Adult	176	500	95	9.5	Grey	Good	
82	M	Adult	178	505	96	9.6	Grey	Good	
83	M	Adult	180	510	97	9.7	Grey	Good	
84	M	Adult	182	515	98	9.8	Grey	Good	
85	M	Adult	184	520	99	9.9	Grey	Good	
86	M	Adult	186	525	100	10.0	Grey	Good	
87	M	Adult	188	530	101	10.1	Grey	Good	
88	M	Adult	190	535	102	10.2	Grey	Good	
89	M	Adult	192	540	103	10.3	Grey	Good	
90	M	Adult	194	545	104	10.4	Grey	Good	
91	M	Adult	196	550	105	10.5	Grey	Good	
92	M	Adult	198	555	106	10.6	Grey	Good	
93	M	Adult	200	560	107	10.7	Grey	Good	
94	M	Adult	202	565	108	10.8	Grey	Good	
95	M	Adult	204	570	109	10.9	Grey	Good	
96	M	Adult	206	575	110	11.0	Grey	Good	
97	M	Adult	208	580	111	11.1	Grey	Good	
98	M	Adult	210	585	112	11.2	Grey	Good	
99	M	Adult	212	590	113	11.3	Grey	Good	
100	M	Adult	214	595	114	11.4	Grey	Good	
101	M	Adult	216	600	115	11.5	Grey	Good	
102	M	Adult	218	605	116	11.6	Grey	Good	
103	M	Adult	220	610	117	11.7	Grey	Good	
104	M	Adult	222	615	118	11.8	Grey	Good	
105	M	Adult	224	620	119	11.9	Grey	Good	
106	M	Adult	226	625	120	12.0	Grey	Good	
107	M	Adult	228	630	121	12.1	Grey	Good	
108	M	Adult	230	635	122	12.2	Grey	Good	
109	M	Adult	232	640	123	12.3	Grey	Good	
110	M	Adult	234	645	124	12.4	Grey	Good	
111	M	Adult	236	650	125	12.5	Grey	Good	
112	M	Adult	238	655	126	12.6	Grey	Good	
113	M	Adult	240	660	127	12.7	Grey	Good	
114	M	Adult	242	665	128	12.8	Grey	Good	
115	M	Adult	244	670	129	12.9	Grey	Good	
116	M	Adult	246	675	130	13.0	Grey	Good	
117	M	Adult	248	680	131	13.1	Grey	Good	
118	M	Adult	250	685	132	13.2	Grey	Good	
119	M	Adult	252	690	133	13.3	Grey	Good	
120	M	Adult	254	695	134	13.4	Grey	Good	
121	M	Adult	256	700	135	13.5	Grey	Good	
122	M	Adult	258	705	136	13.6	Grey	Good	
123	M	Adult	260	710	137	13.7	Grey	Good	
124	M	Adult	262	715	138	13.8	Grey	Good	
125	M	Adult	264	720	139	13.9	Grey	Good	
126	M	Adult	266	725	140	14.0	Grey	Good	
127	M	Adult	268	730	141	14.1	Grey	Good	
128	M	Adult	270	735	142	14.2	Grey	Good	
129	M	Adult	272	740	143	14.3	Grey	Good	
130	M	Adult	274	745	144	14.4	Grey	Good	
131	M	Adult	276	750	145	14.5	Grey	Good	
132	M	Adult	278	755	146	14.6	Grey	Good	
133	M	Adult	280	760	147	14.7	Grey	Good	
134	M	Adult	282	765	148	14.8	Grey	Good	
135	M	Adult	284	770	149	14.9	Grey	Good	
136	M	Adult	286	775	150	15.0	Grey	Good	
137	M	Adult	288	780	151	15.1	Grey	Good	
138	M	Adult	290	785	152	15.2	Grey	Good	
139	M	Adult	292	790	153	15.3	Grey	Good	
140	M	Adult	294	795	154	15.4	Grey	Good	
141	M	Adult	296	800	155	15.5	Grey	Good	
142	M	Adult	298	805	156	15.6	Grey	Good	
143	M	Adult	300	810	157	15.7	Grey	Good	
144	M	Adult	302	815	158	15.8	Grey	Good	
145	M	Adult	304	820	159	15.9	Grey	Good	
146	M	Adult	306	825	160	16.0	Grey	Good	
147	M	Adult	308	830	161	16.1	Grey	Good	
148	M	Adult	310	835	162	16.2	Grey	Good	
149	M	Adult	312	840	163	16.3	Grey	Good	
150	M	Adult	314	845	164	16.4	Grey	Good	
151	M	Adult	316	850	165	16.5	Grey	Good	
152	M	Adult	318	855	166	16.6	Grey	Good	
153	M	Adult	320	860	167	16.7	Grey	Good	
154	M	Adult	322	865	168	16.8	Grey	Good	
155	M	Adult	324	870	169	16.9	Grey	Good	
156	M	Adult	326	875	170	17.0	Grey	Good	
157	M	Adult	328	880	171	17.1	Grey	Good	
158	M	Adult	330	885	172	17.2	Grey	Good	
159	M	Adult	332	890	173	17.3	Grey	Good	
160	M	Adult	334	895	174	17.4	Grey	Good	
161	M	Adult	336	900	175	17.5	Grey	Good	
162	M	Adult	338	905	176	17.6	Grey	Good	
163	M	Adult	340	910	177	17.7	Grey	Good	
164	M	Adult	342	915	178	17.8	Grey	Good	
165	M	Adult	344	920	179	17.9	Grey	Good	
166	M	Adult	346	925	180	18.0	Grey	Good	
167	M	Adult	348	930	181	18.1	Grey	Good	
168	M	Adult	350	935	182	18.2	Grey	Good	
169	M	Adult	352	940	183	18.3	Grey	Good	
170	M	Adult	354	945	184	18.4	Grey	Good	
171	M	Adult	356	950	185	18.5</			

Table I

Summary of EBR-II Scrams from Power

April 1 to June 30, 1966

Month	Day	Time	Power Level	Parameter	Remarks
April	7	0915	37.5 MW	Ch #9 switch	Scram occurred when switch placed in "Test" position. Nothing abnormal found.
April	12	0907	45 MW	Flow rate of change	Failed tube in amplifier for No. 2 Pri. Pump flow instrument. Replaced tube.
April	13	1310	45 MW	Upper plenum high press.	Instrument technician checking instrument.
April	18	1230	25 MW	Manual	Plugged filter caused loss of cooling water to Sec. Sodium pump.
April	20	0330	45 MW	Bulk sodium high temp.	Loss of Sec. sodium flow caused by failed diodes in sec. M-G set excitation system.
April	26	1550	45 MW	Manual	Incoming 13.8KV lines tripped on low frequency. Manually tripped generator.
May	29	0434	45 MW	Reactor outlet low flow	Failed tube in flow instrument.
June	1	2000	45 MW	Pri. Pump . No. 1 system ref. voltage low	No. 1 clutch thyatron failed on over-heating due to failure of panel blower.
June	7	1420	45 MW	Power system	Large voltage fluctuation on 138 KV system.
June	14	0210	45 MW	Subassembly outlet temp. high	Checking sub. outlet temps. - scram occurred with only one channel tripped.

Table II
OPERATING HISTORY DATA
April, 1966

Date	Reactor	Cumulative	Gross	Cumulative	Gross	Cumulative	Generator	Cumulative	Thermal	Power
	Critical	Critical	Thermal	Gross	Electrical	Gross	on	Generator	on	Range
	Time	Time	Energy	Thermal	Energy	Electrical	Time	Time	Max.	Min.
	Hrs	Hrs	MWht	MWht	MWhe	MWhe	Hrs	Hrs	MW	MW
24	4588.1	1080	139679	334	38406	24	3029.9	45	45	
24	4612.1	1080	140759	327	38733	24	3053.9	45	45	
20.5	4632.6	840	141599	248	38981	18	3071.9	45	0	
24	4656.6	1080	142679	328	39309	24	3095.9	45	45	
24	4680.6	1080	143759	329	39638	24	3119.9	45	45	
24	4704.6	1080	144839	328	39966	24	3143.9	45	45	
23	4727.6	933	145772	273	40239	21	3164.9	45	0	
24	4751.6	1080	146852	327	40566	24	3188.9	45	45	
24	4775.6	1080	146932	328	40894	24	3212.9	45	45	
24	4799.6	1080	149012	327	41221	24	3236.9	45	45	
24	4823.6	1080	150092	328	41549	24	3260.9	45	45	
22.5	4846.1	918	151010	256	41805	20	3280.9	45	0	
23	4869.1	1003	152013	286	42091	21.3	3302.2	45	0	
17.9	4887.0	747	152760	228	42319	16.5	3318.7	45	0	
0	4887.0	0	152760	0	42319	0	3318.7	0	0	
0	4887.0	0	152760	0	42319	0	3318.7	0	0	
1.0	4888.0	0	152760	0	42319	0	3318.7	0.5	0	
13.6	4901.6	331	153091	80	42399	6	3324.7	45	0	
24	4925.6	1080	154171	335	42734	24	3348.7	45	45	
22.5	4948.1	734	154905	216	42950	15.9	3364.6	45	0	
24	4972.1	1080	155985	320	43270	24	3388.6	45	45	
24	4996.1	1080	157065	332	43602	24	3412.6	45	45	
24	5020.1	1080	158145	328	43930	24	3436.6	45	45	
24	5044.1	1080	159225	326	44256	24	3460.6	45	45	
24	5068.1	1080	160305	347	44603	24	3484.6	45	45	
20	5088.1	821	161126	229	44832	17.4	3502.0	45	0	
24	5112.1	1080	162206	346	45178	24	3526.0	45	45	
24	5136.1	1080	163286	335	45513	24	3550.0	45	45	
24	5160.1	1080	164366	337	45850	24	3574.0	45	45	
20	5180.1	119	164485	19	45869	1.5	3575.5	45	0	

Table II (cont.)
OPERATING HISTORY DATA
May, 1966

Date	Reactor	Cumulative	Gross	Cumulative	Gross	Cumulative	Generator	Cumulative	Thermal Power	
	Critical Time	Critical Time	Thermal Energy	Gross Thermal Energy	Electrical Energy	Gross Electrical Energy	on Time	Generator on Time	Max.	Range Min.
	Hrs	Hrs	MWht	MWht	MWhe	MWhe	Hrs	Hrs	MW	NW
1	24	5204.1	1080	165565	331	46200	24	3599.5	45	45
2	24	5228.1	1080	166645	335	46535	24	3623.5	45	45
3	23.5	5251.6	614	167259	165	46700	13.3	3636.8	45	45
4	24	5275.6	1080	168339	333	47033	24	3660.8	45	45
5	23.5	5299.1	680	169019	209	47242	15.2	3676.0	45	45
6	21.5	5320.6	438	169457	120	47362	10	3686.0	45	45
7	24	5344.6	1080	170537	335	47697	24	3710.0	45	45
8	20	5364.6	850	171387	238	47935	18.7	3728.7	45	45
9	0	5364.6	0	171387	0	47935	0	3728.7	0	0
10	0	5364.6	0	171387	0	47935	0	3728.7	0	0
11	2	5366.6	12	171399	0	47935	0	3728.7	10	0
12	18	5384.6	160	171559	0	47935	0	3728.7	9	0
13	18.5	5403.1	571	172130	129	48064	12	3740.7	45	45
14	24	5427.1	1080	173210	338	48402	24	3764.7	45	45
15	24	5451.1	1080	174290	336	48738	24	3788.7	45	45
16	24	5475.1	1080	175370	337	49075	24	3812.7	45	45
17	24	5499.1	1063	176433	293	49368	21.3	3834.0	45	40
18	24	5523.1	1080	177513	336	49704	24	3858.0	45	45
19	24	5547.1	1080	178593	331	50035	24	3882.0	45	45
20	24	5571.1	1080	179673	330	50365	24	3906.0	45	45
21	24	5595.1	1080	180753	331	50696	24	3930.0	45	45
22	24	5619.1	1080	181833	331	51027	24	3954.0	45	45
23	21.5	5640.6	922	182755	167	51194	20.7	3974.7	45	0
24	0	5640.6	0	182755	0	51194	0	3974.7	0	0
25	10.4	5651.0	70	182825	3	51197	0.3	3975.0	37	0
26	22	5673.0	955	183780	287	51484	20.3	3995.3	45	0
27	24	5697.0	1048	184828	324	51808	23.0	4018.3	45	20
28	24	5721.0	1080	185908	335	52143	24	4042.3	45	45
29	23	5744.0	980	186888	300	52443	22.1	4064.4	45	0
30	24	5768.0	1080	187968	336	52779	24.0	4088.4	45	45
31	24	5792.0	1080	189048	324	53103	24.0	4112.4	45	45

Table II (cont.)

OPERATING HISTORY DATA

June, 1966

Date	Reactor	Cumulative	Gross	Cumulative	Gross	Cumulative	Generator	Cumulative	Thermal Power
	Critical	Critical	Thermal	Gross	Electrical	Gross	on	Generator	Range
	Time	Time	Energy	Thermal	Energy	Electrical	Time	on	
	Hrs	Hrs	MWht	MWht	MWhe	MWhe	Hrs	Hrs	MW
									MW
1	22.5	5814.5	948	189996	291	53394	21	4133.4	45
2	24	5838.5	1080	191076	343	53737	24	4157.4	45
3	24	5862.5	1080	192156	344	54081	24	4181.4	45
4	24	5886.5	1080	193236	344	54425	24	4205.4	45
5	24	5910.5	1080	194316	344	54769	24	4229.4	45
6	24	5934.5	1080	195396	345	55114	24	4253.4	45
7	21.3	5955.8	919	196315	286	55400	19.8	4273.2	45
8	24	5979.8	1080	197395	321	55721	24	4297.2	45
9	24	6003.8	1080	198475	333	56054	24	4321.2	45
10	24	6027.8	1080	199555	335	56389	24	4345.2	45
11	24	6051.8	1080	200635	336	56725	24	4369.2	45
12	24	6075.8	1080	201715	336	57061	24	4393.2	45
13	24	6099.8	1080	202795	332	57393	24	4417.2	45
14.	22.2	6122.0	963	203758	277	57670	20.4	4437.6	45
15	10.0	6132	7	203765	0	57670	0	4437.6	0.5
16	0	6132	0	203765	0	57670	0	4437.6	0
17	0	6132	0	203765	0	57670	0	4437.6	0
18	0	6132	0	203765	0	57670	0	4437.6	0
19	0	6132	0	203765	0	57670	0	4437.6	0
20	0	6132	0	203765	0	57670	0	4437.6	0
21	0	6132	0	203765	0	57670	0	4437.6	0
22	0	6132	0	203765	0	57670	0	4437.6	0
23	16	6148	7	203772	0	57670	0	4437.6	2.5
24	15	6163	167	203939	2	57672	0.4	4438.0	20
25	4	6167	2	203941	0	57672	0	4438.0	1
26	6	6173	1	203942	0	57672	0	4438.0	0.5
27	22.5	6195.5	960	204902	0	57672	0	4438.0	45
28	18.5	6214.0	741	205643	0	57672	0	4438.0	45
29	8.5	6222.5	60	205703	0	57672	0	4438.0	45
30	0	6222.5	0	205703	0	57672	0	4438.0	0

Fig. 1A

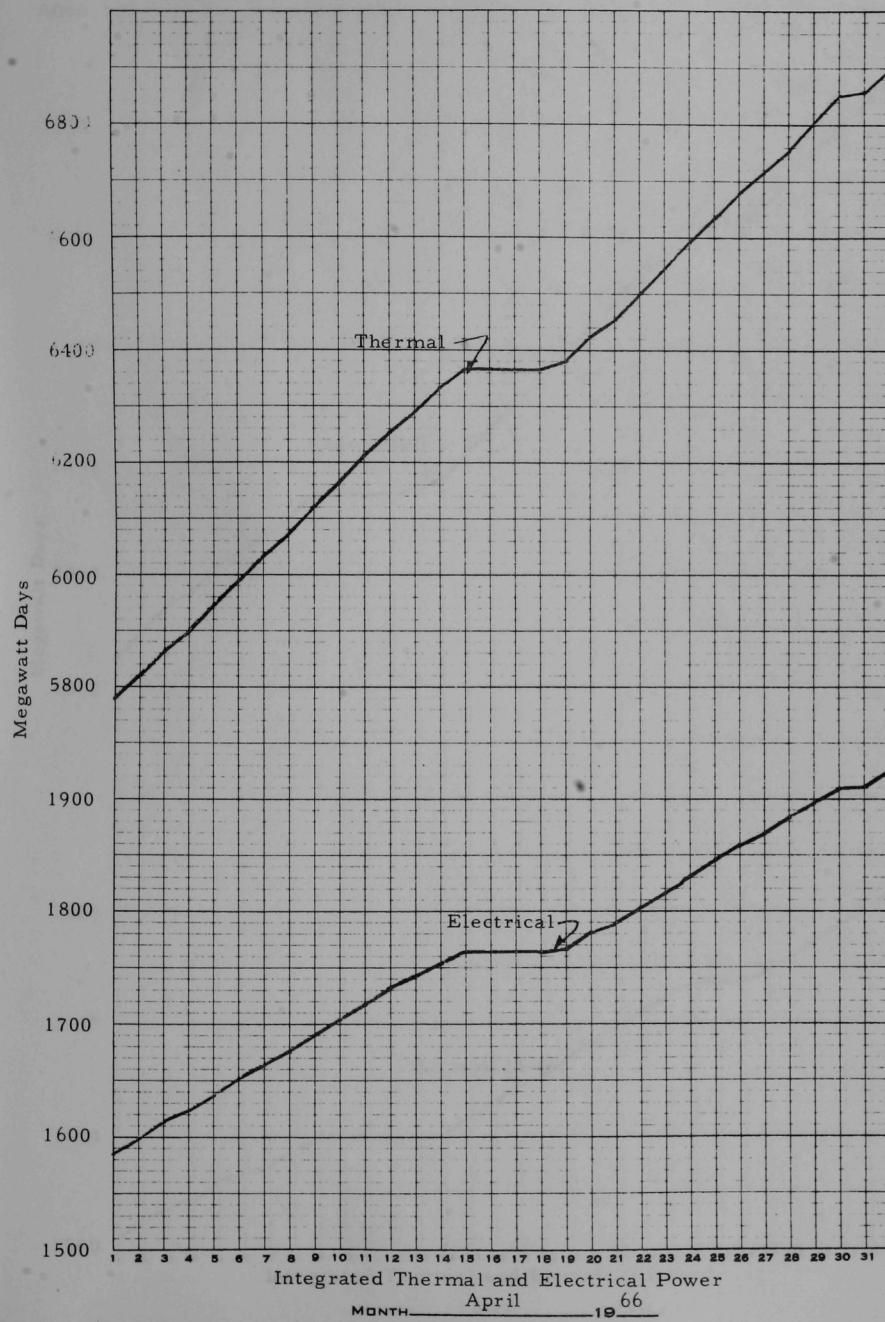


Fig. 1B

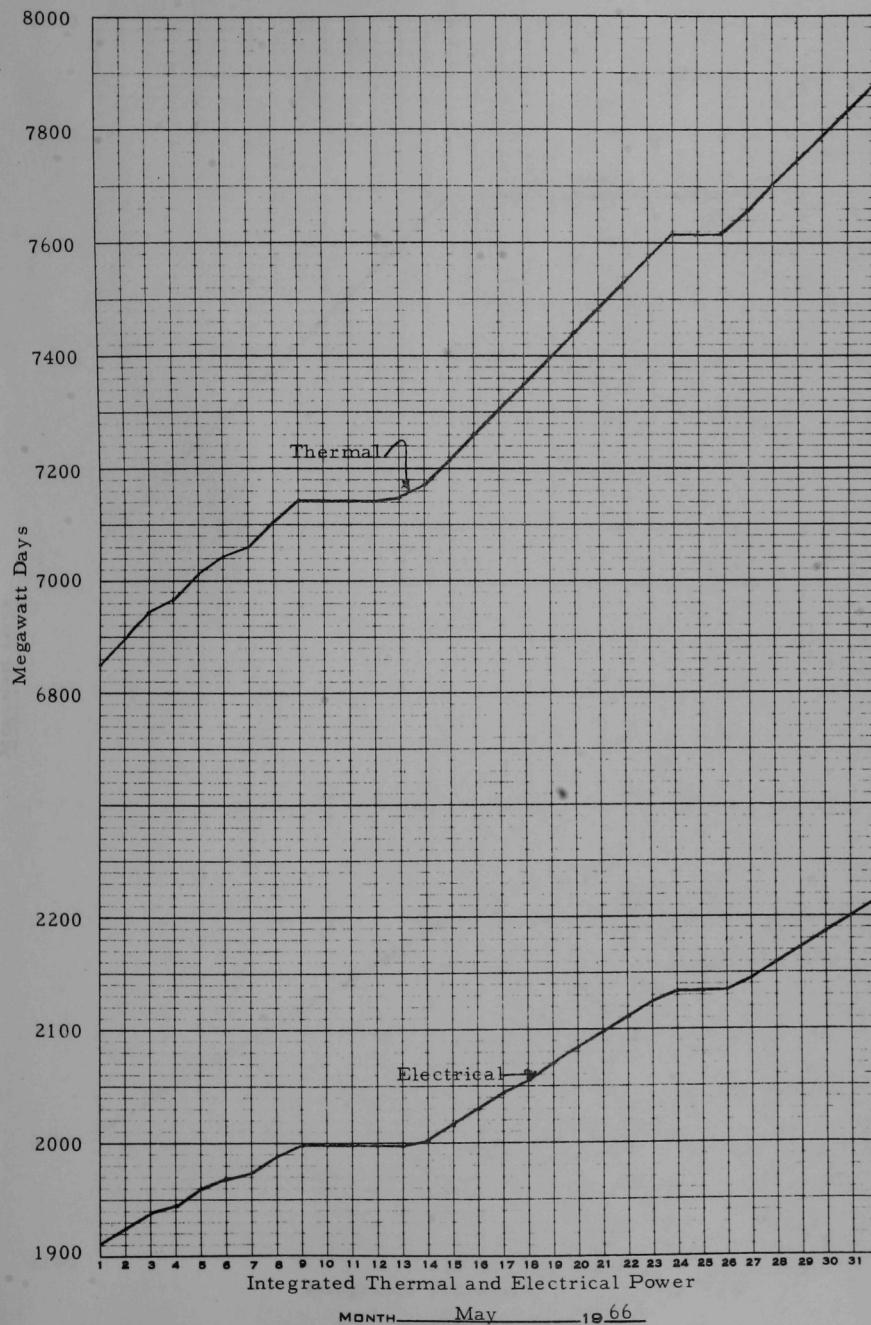
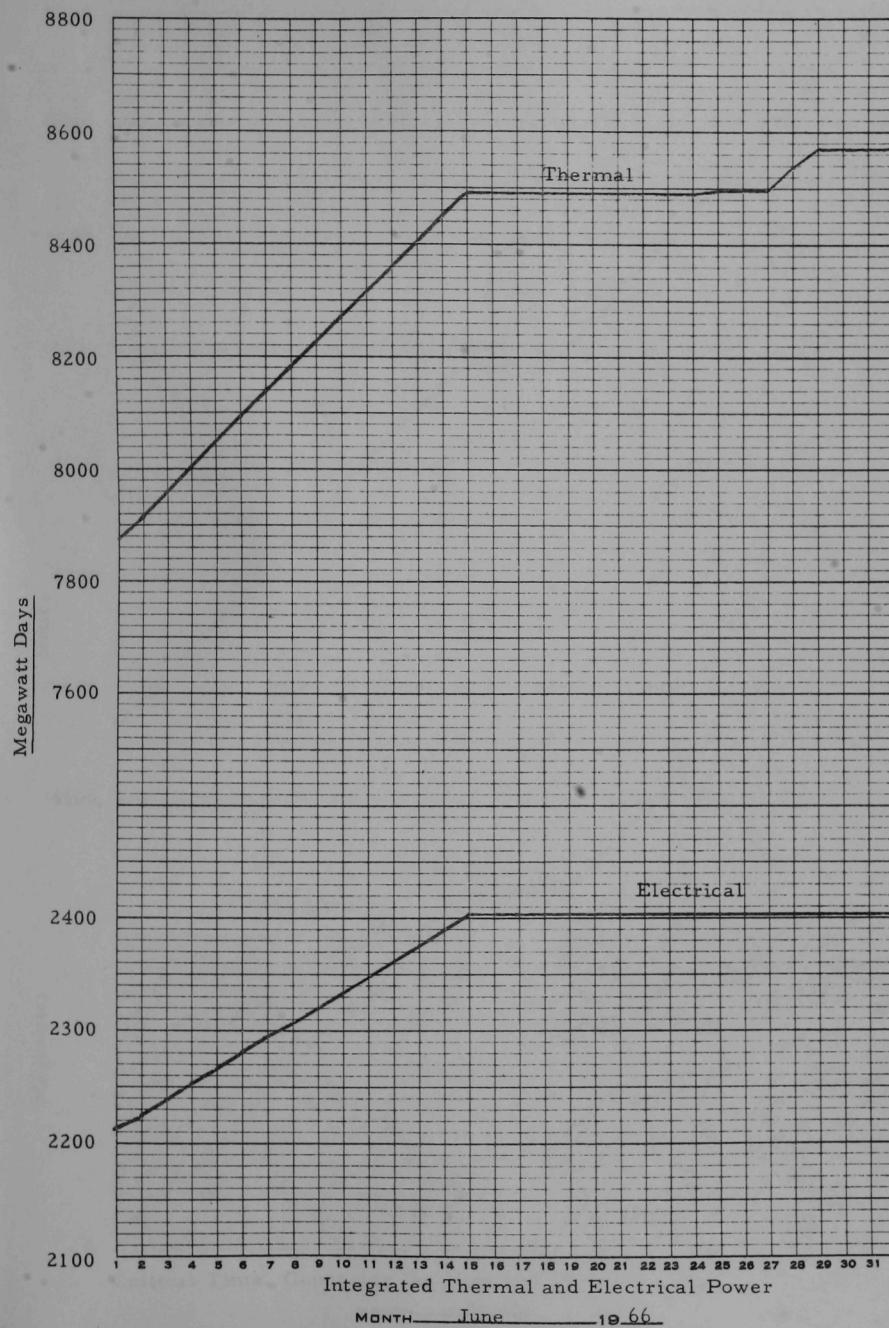


Fig. 1C



MONTH June 1966

Fig. 2A

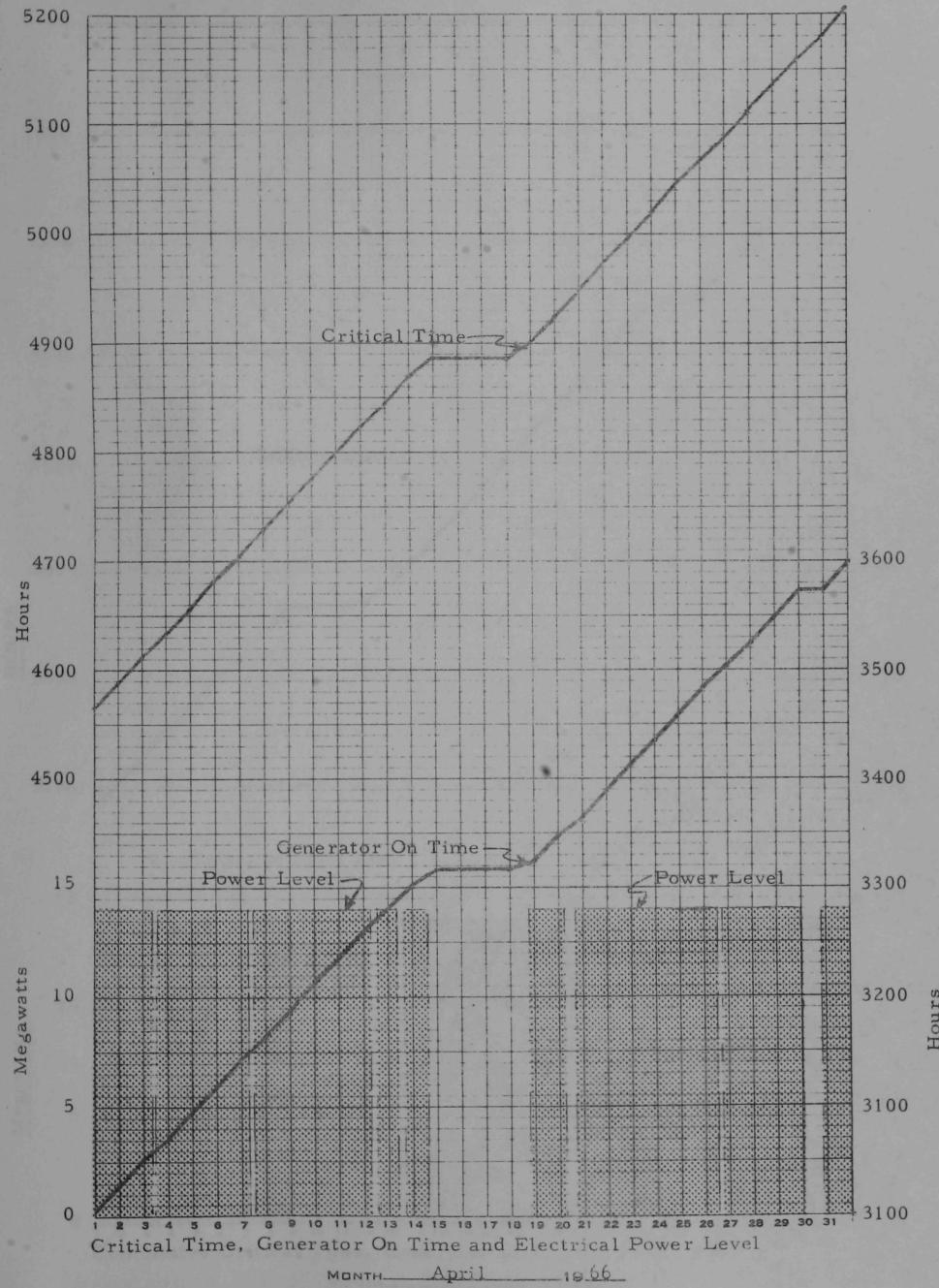


Fig. 2B

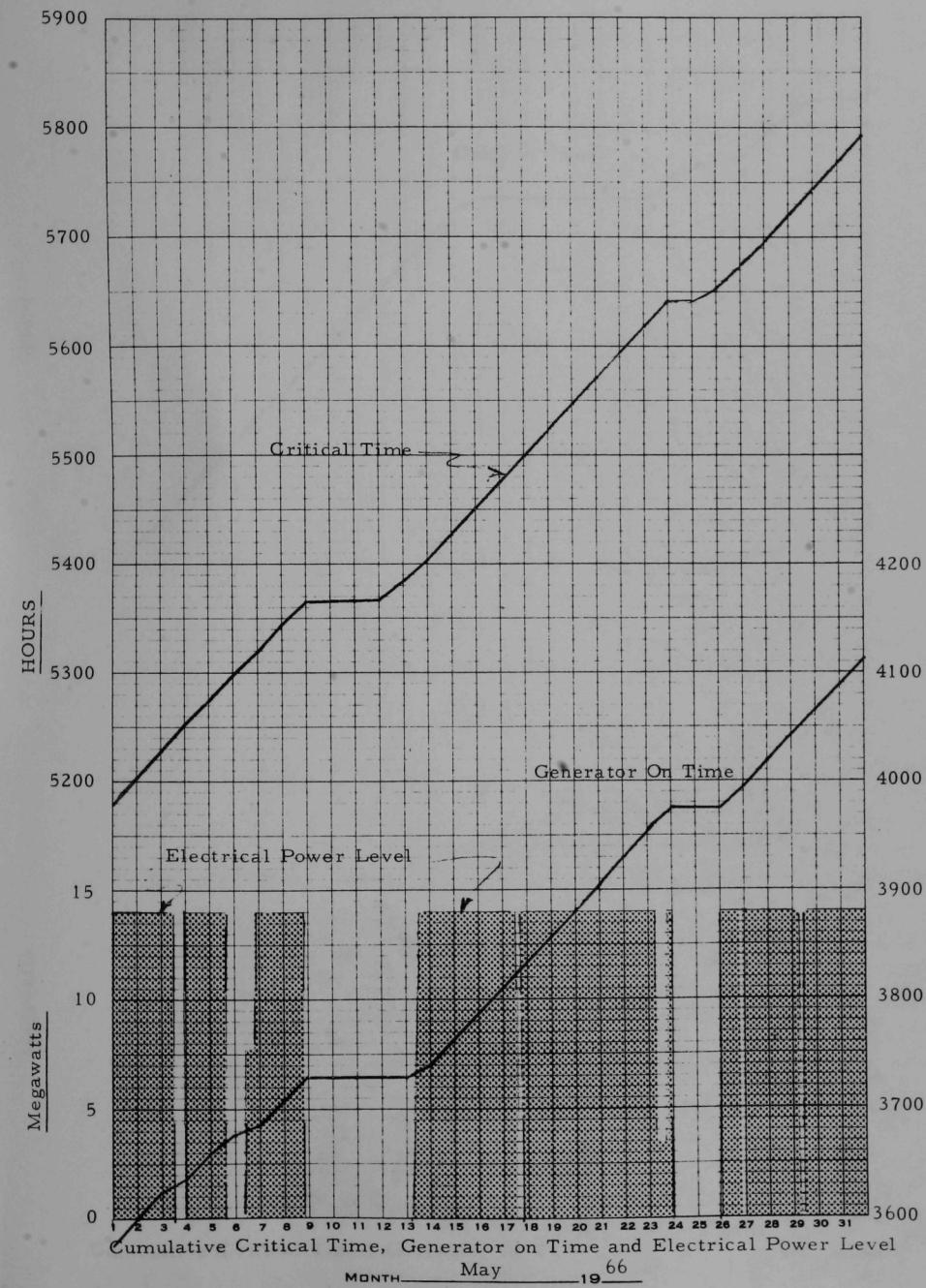


Fig. 2 C

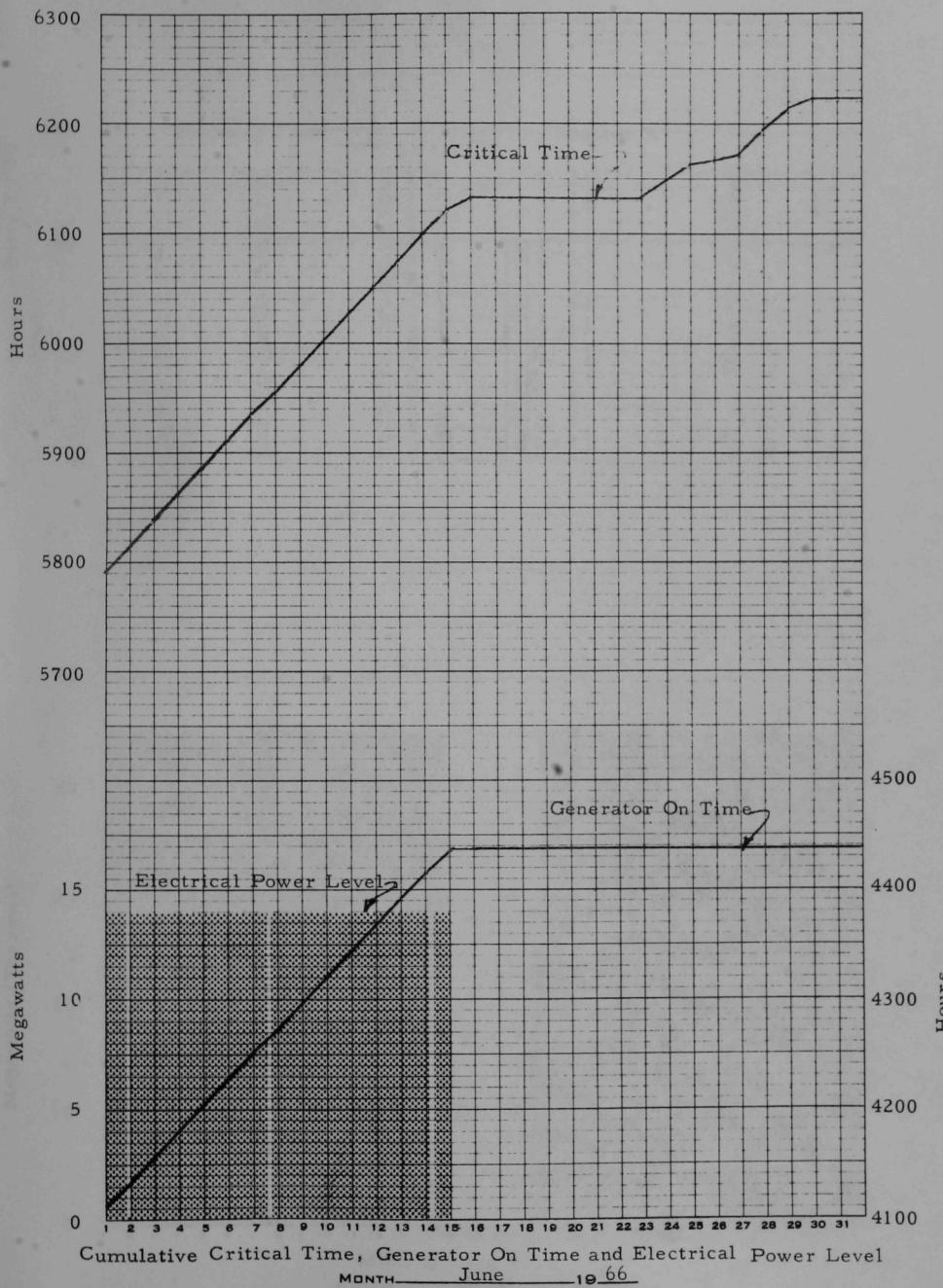


Fig. 3 A

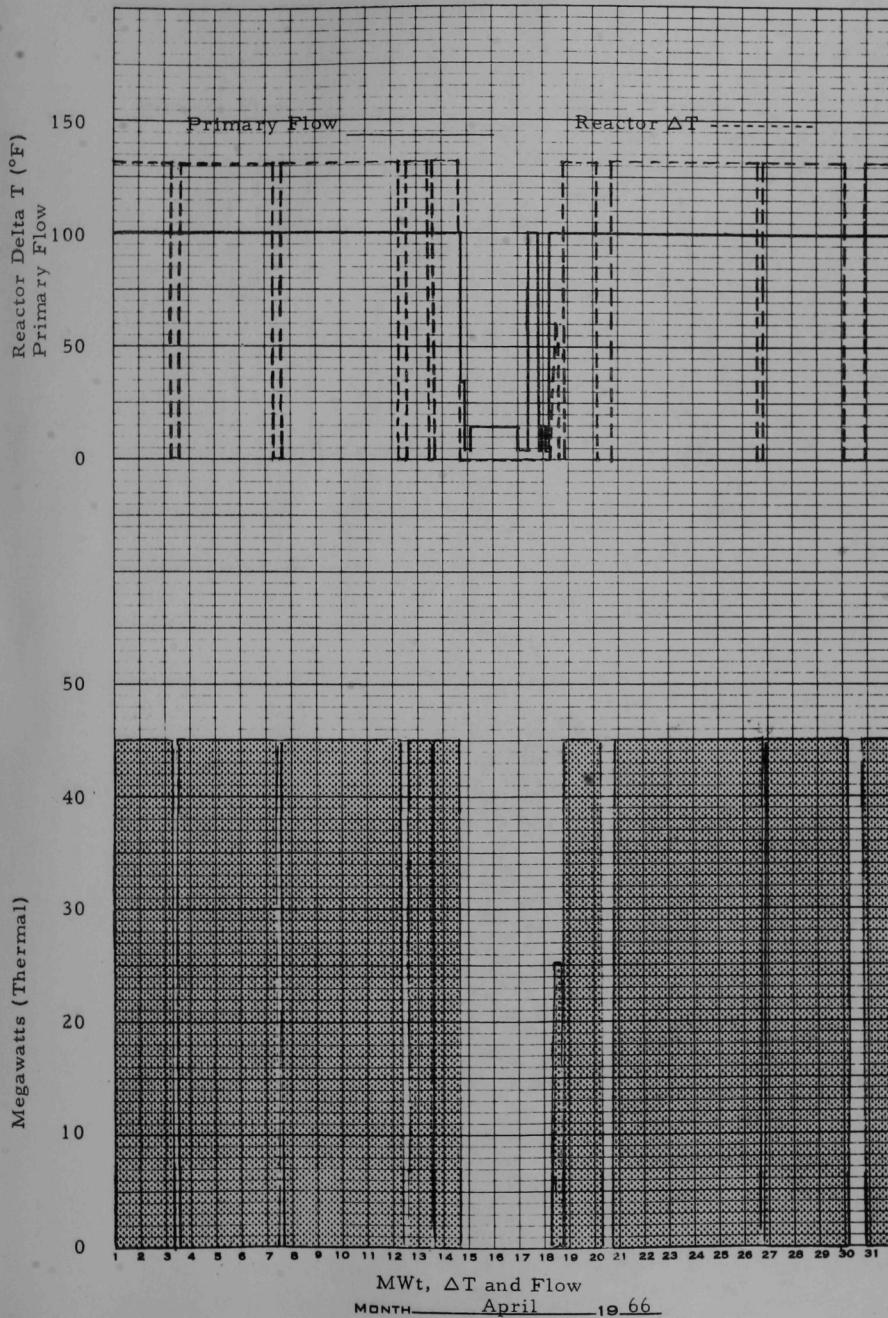


Fig. 3 B

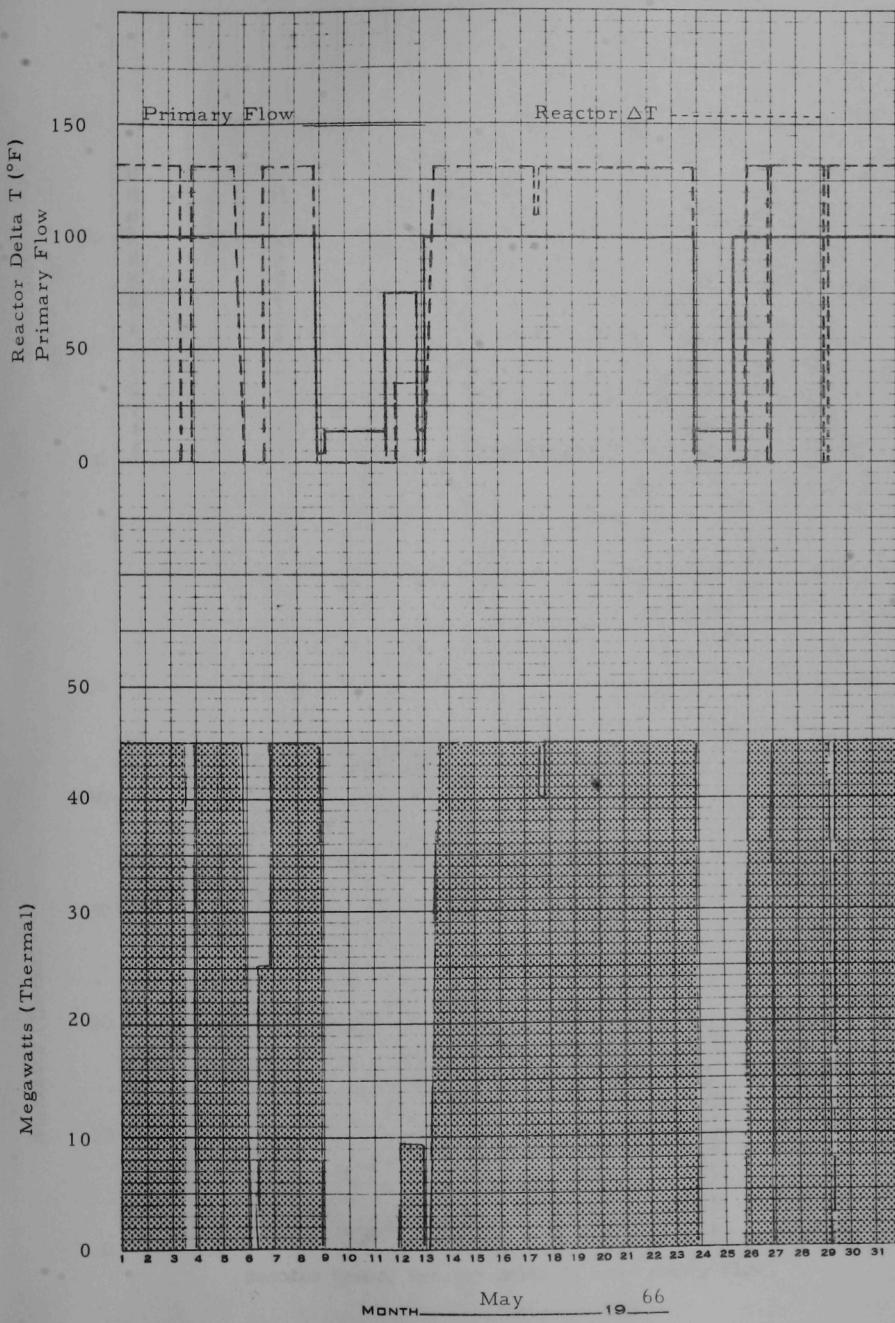


Fig. 3 C

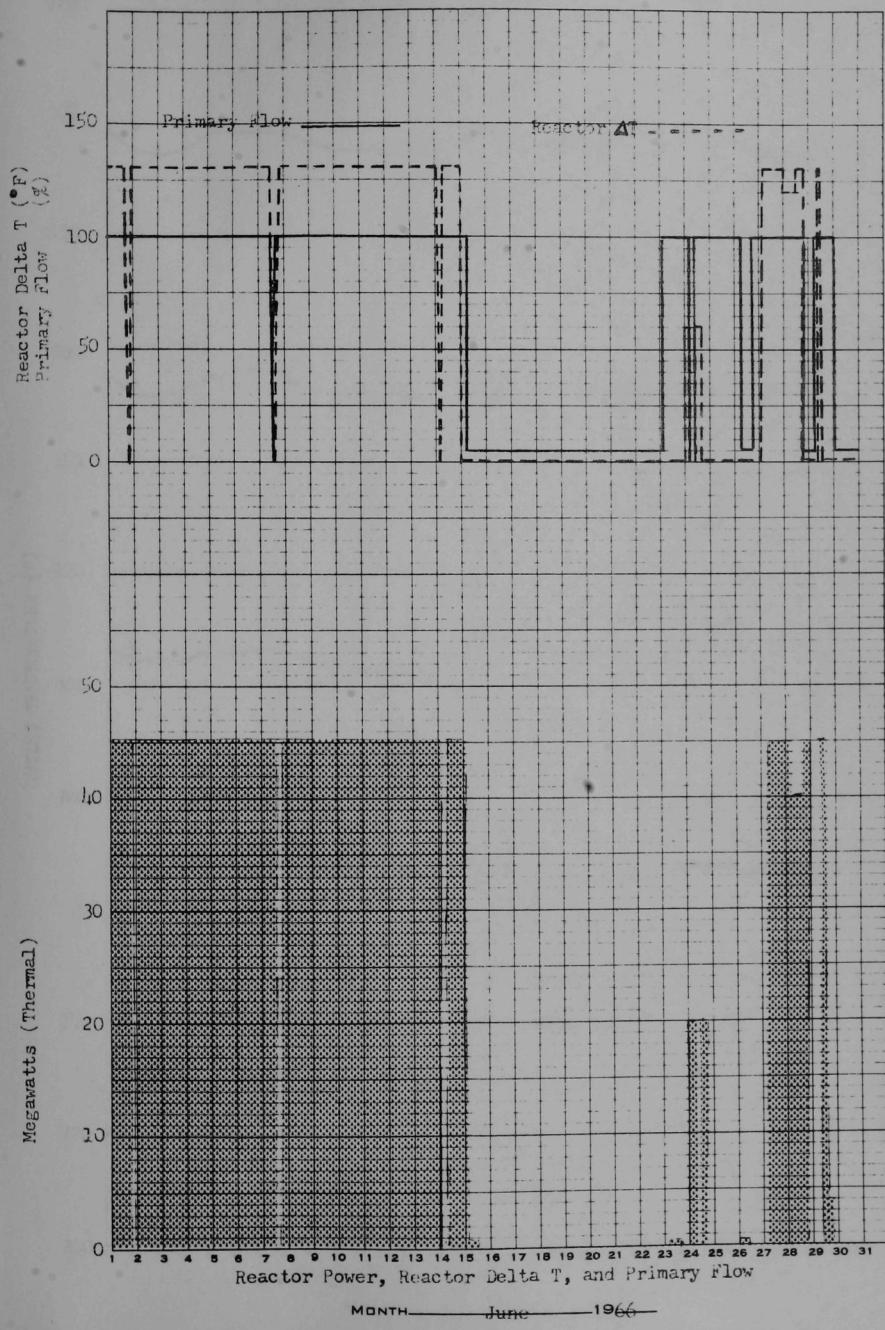


Fig. 4A

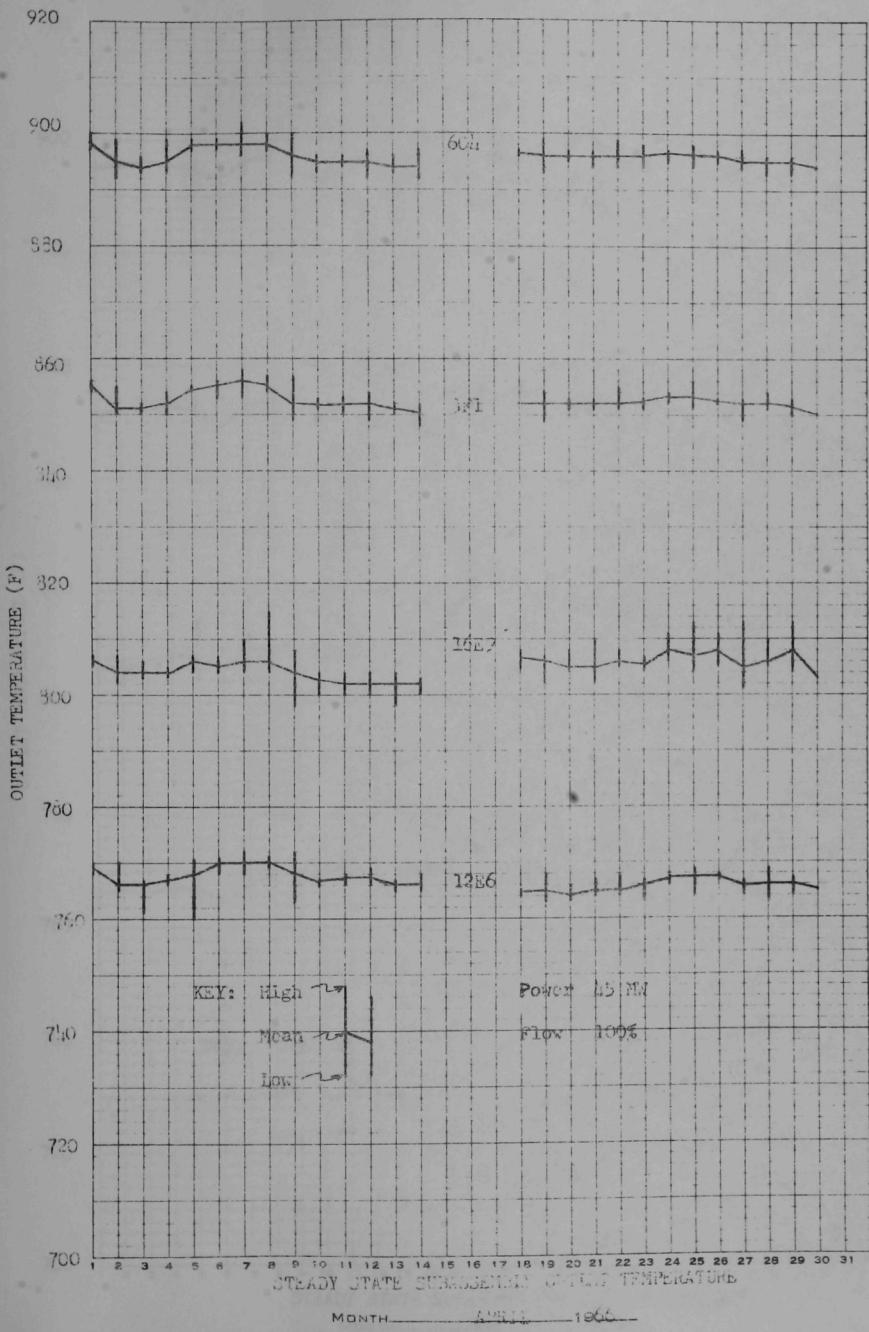


Fig. 4B

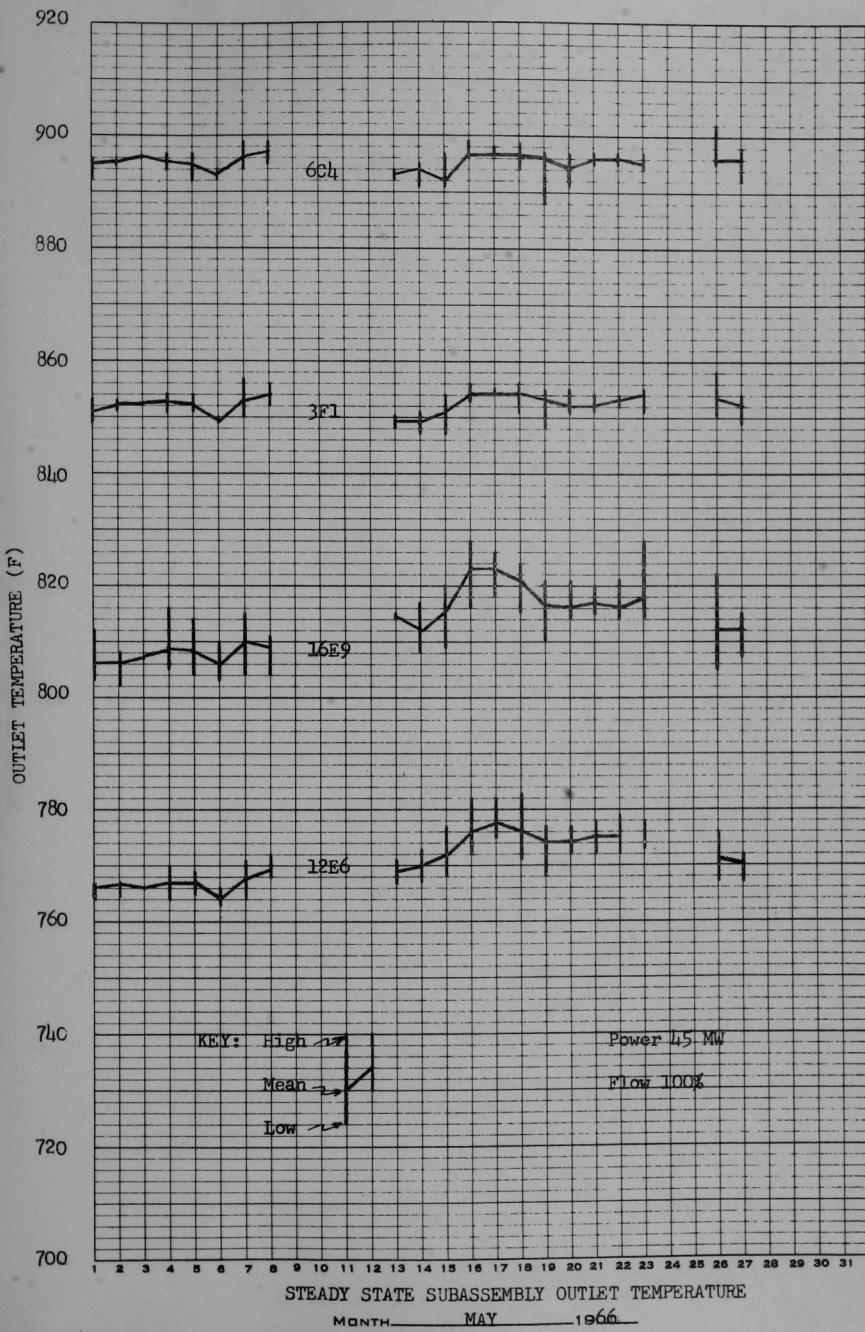


Fig. 4C

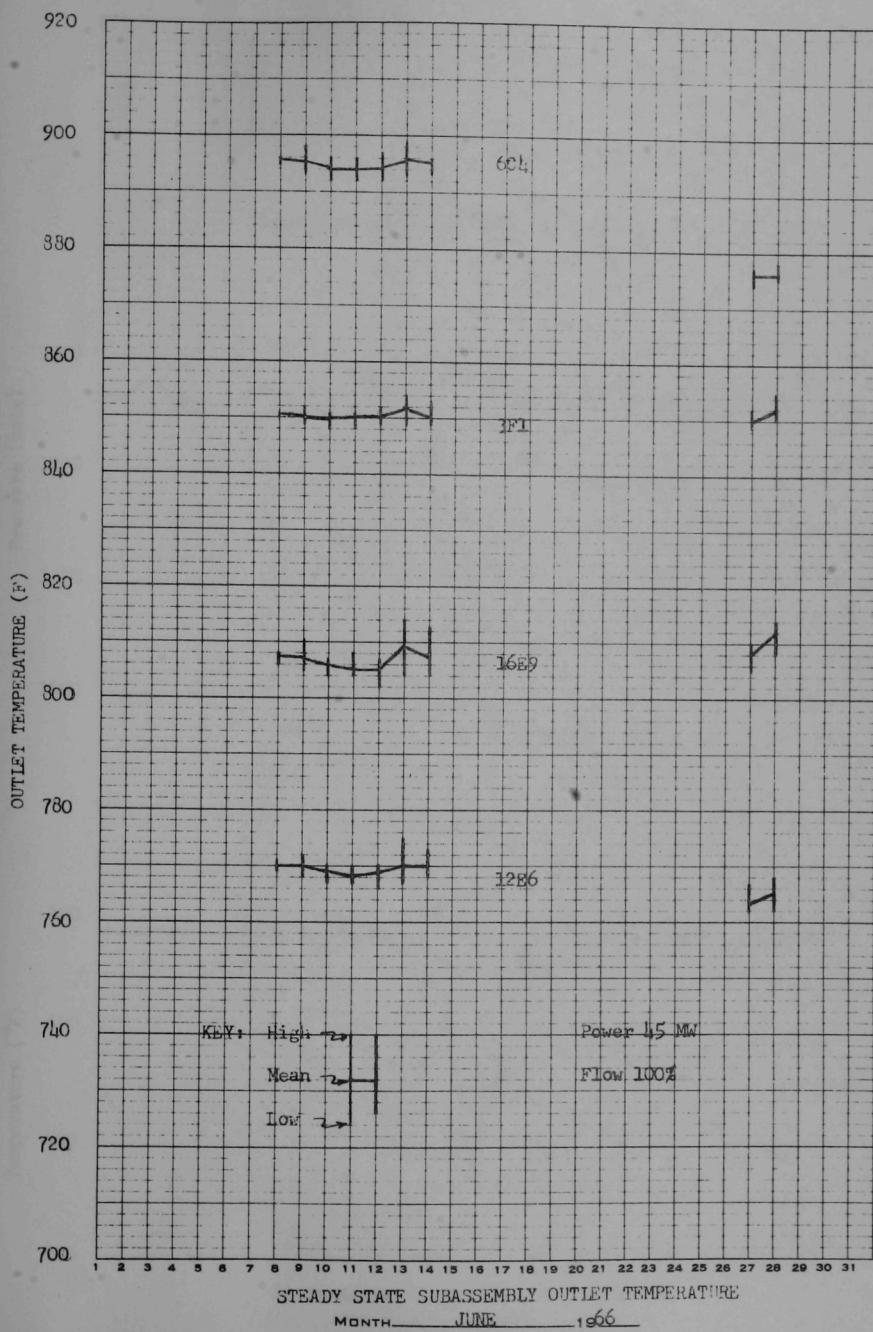
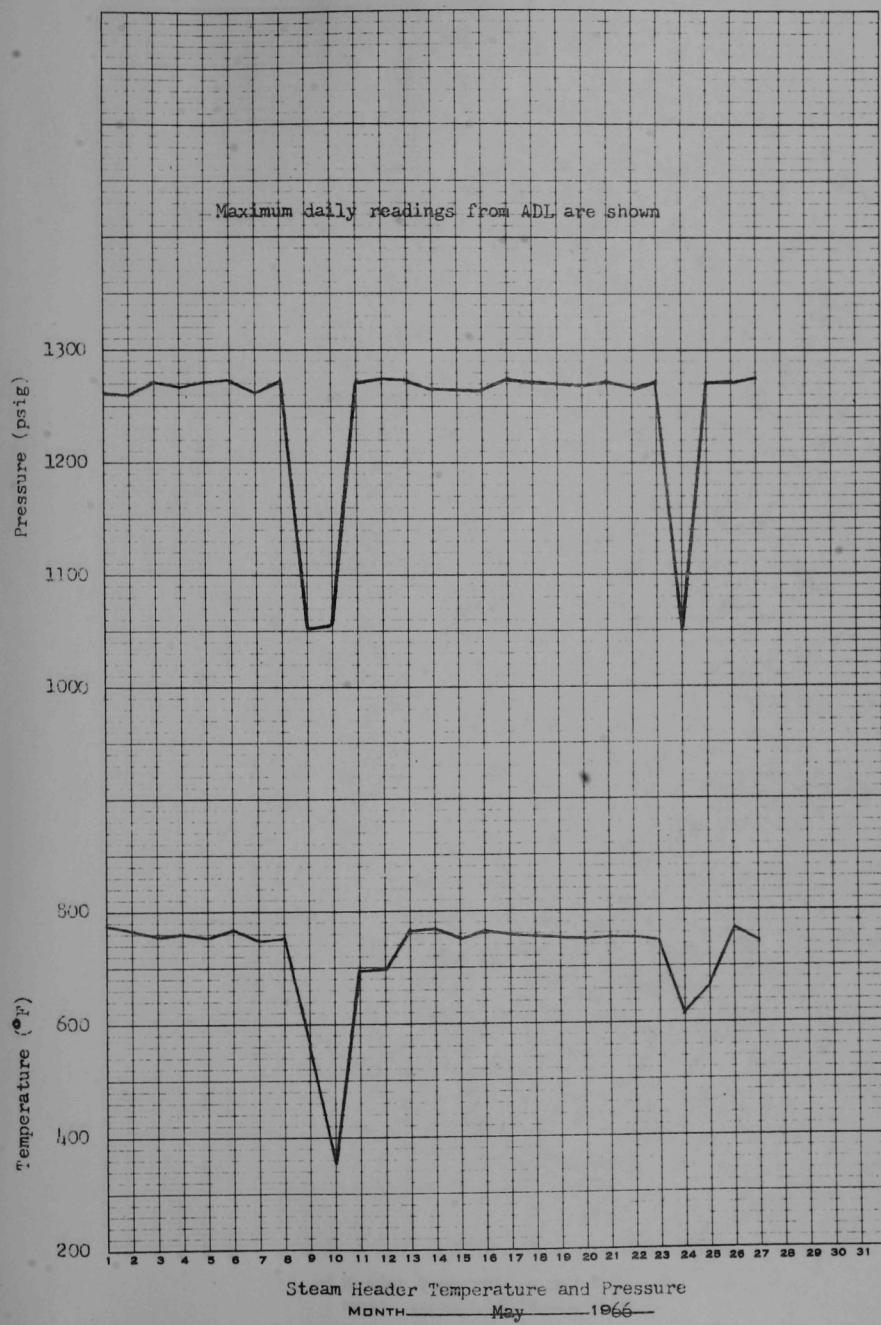


Fig. 5A



Fig. 5B



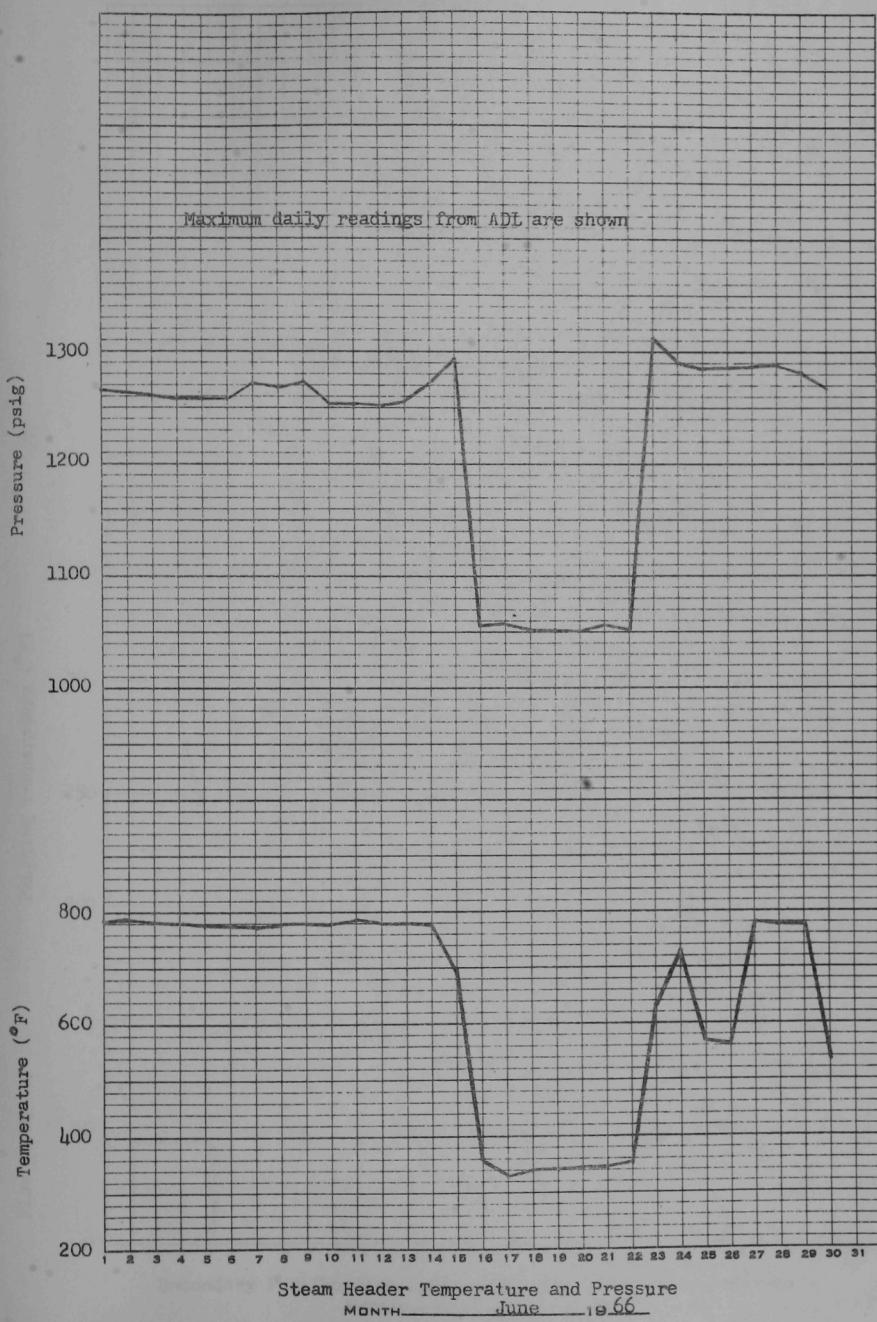


Fig. 6A

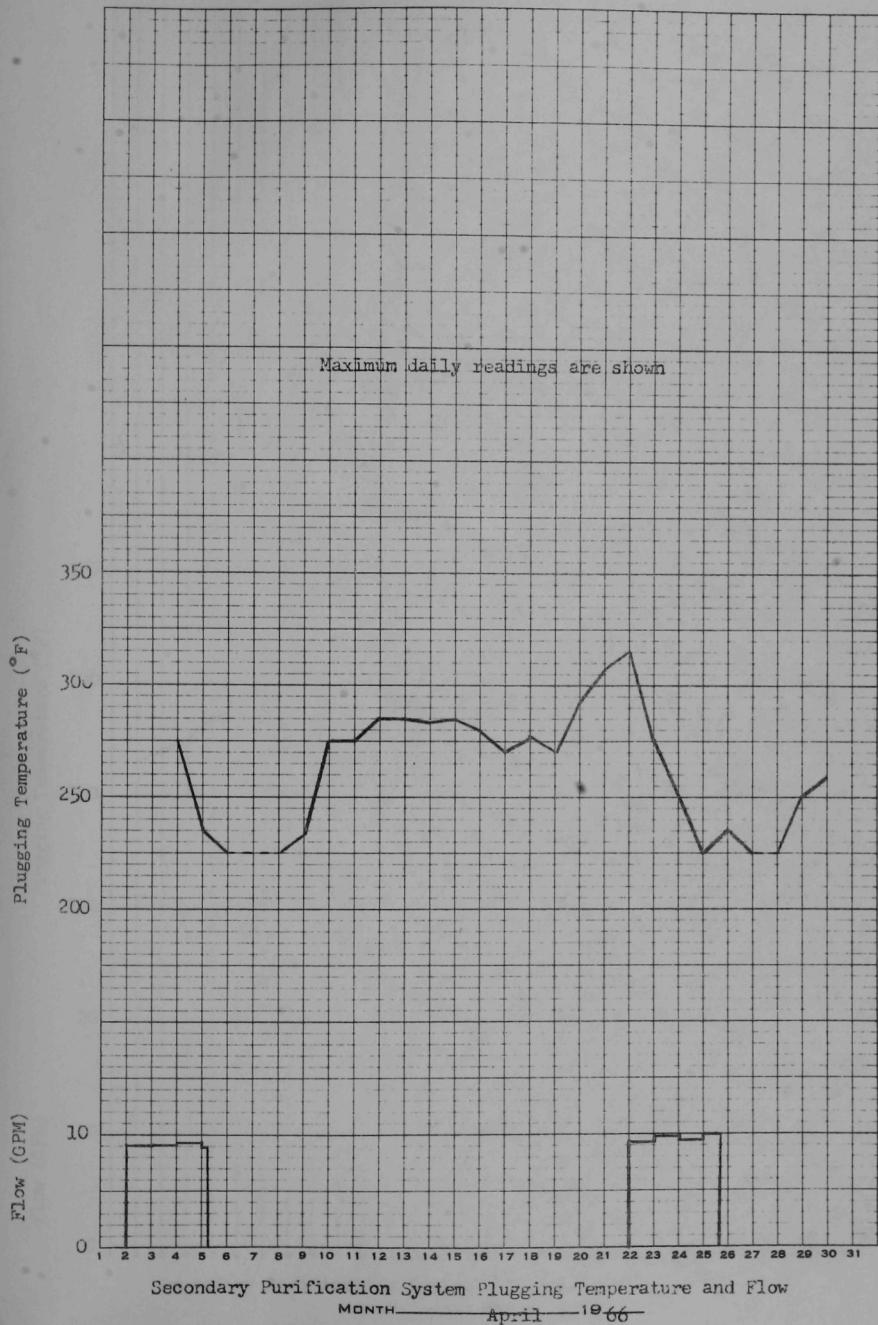


Fig. 6B

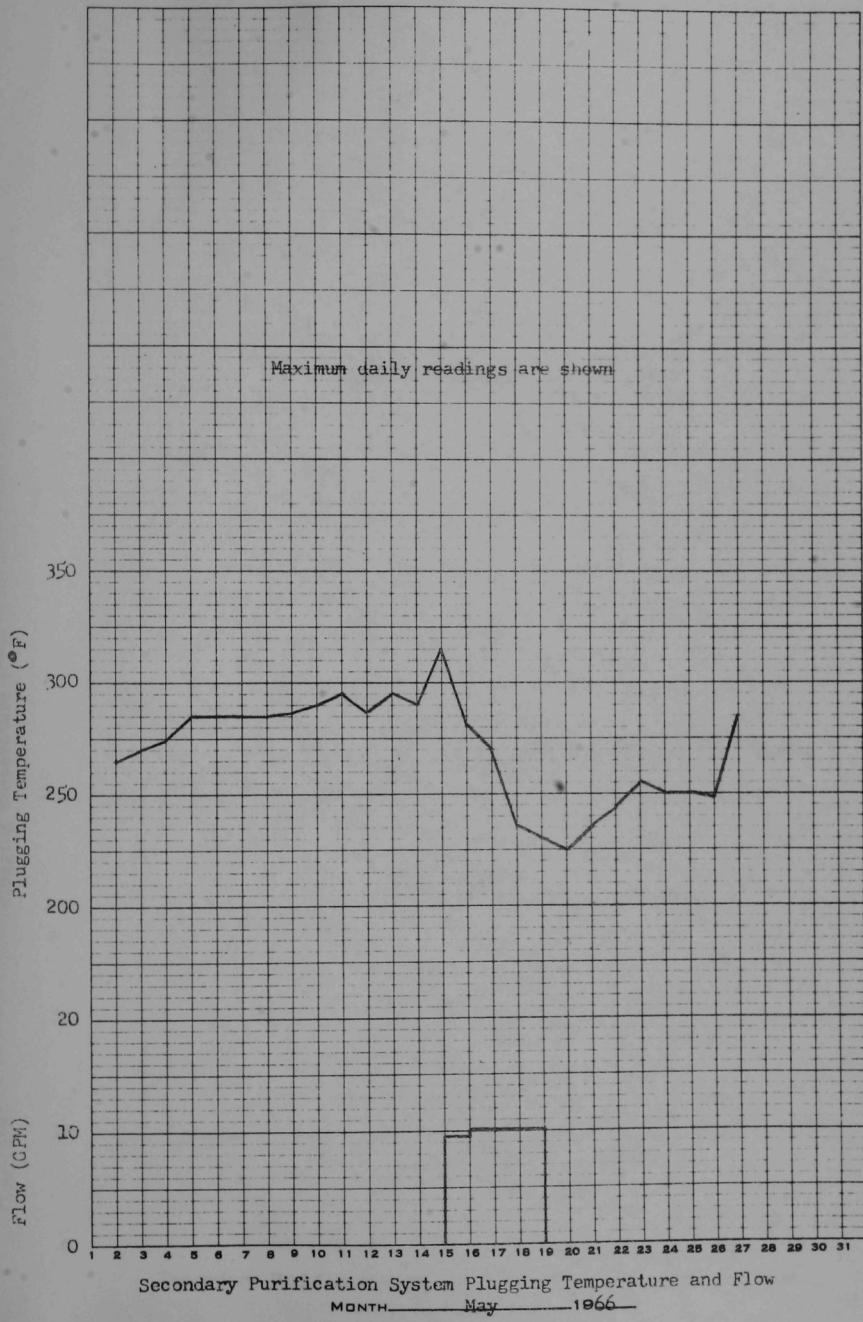


Fig. 6C

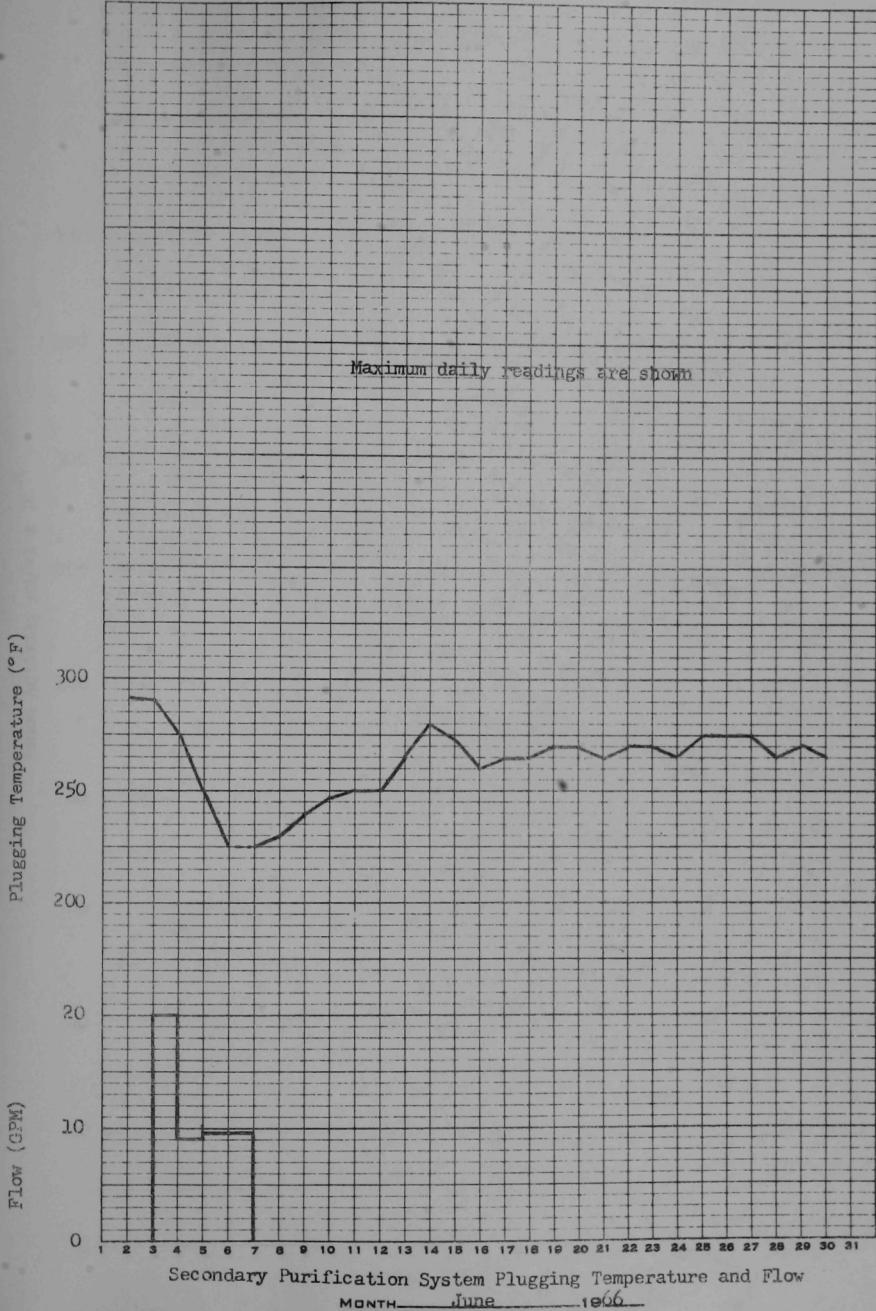


Fig. 7A



Fig. 7B

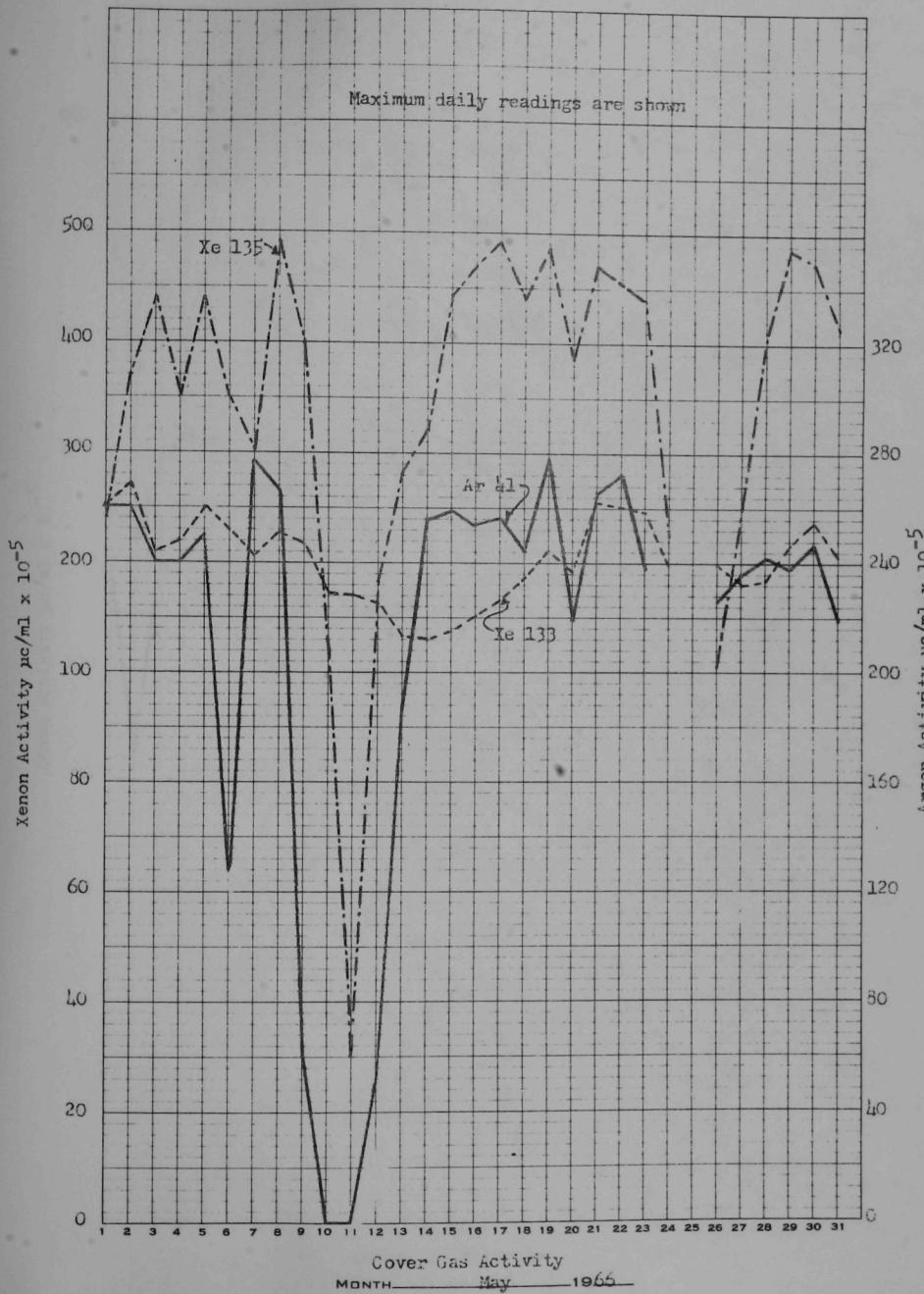


Fig. 7C

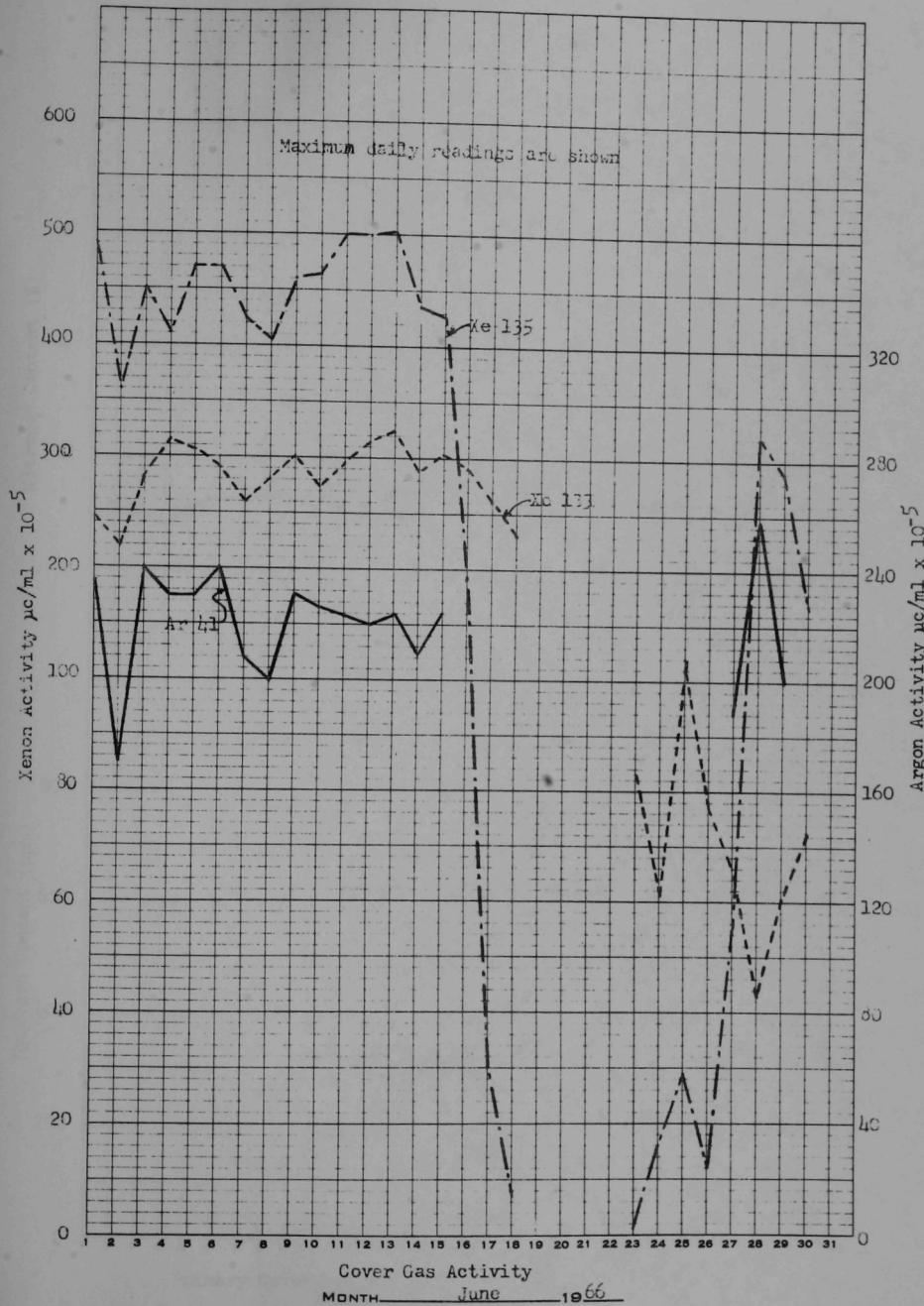
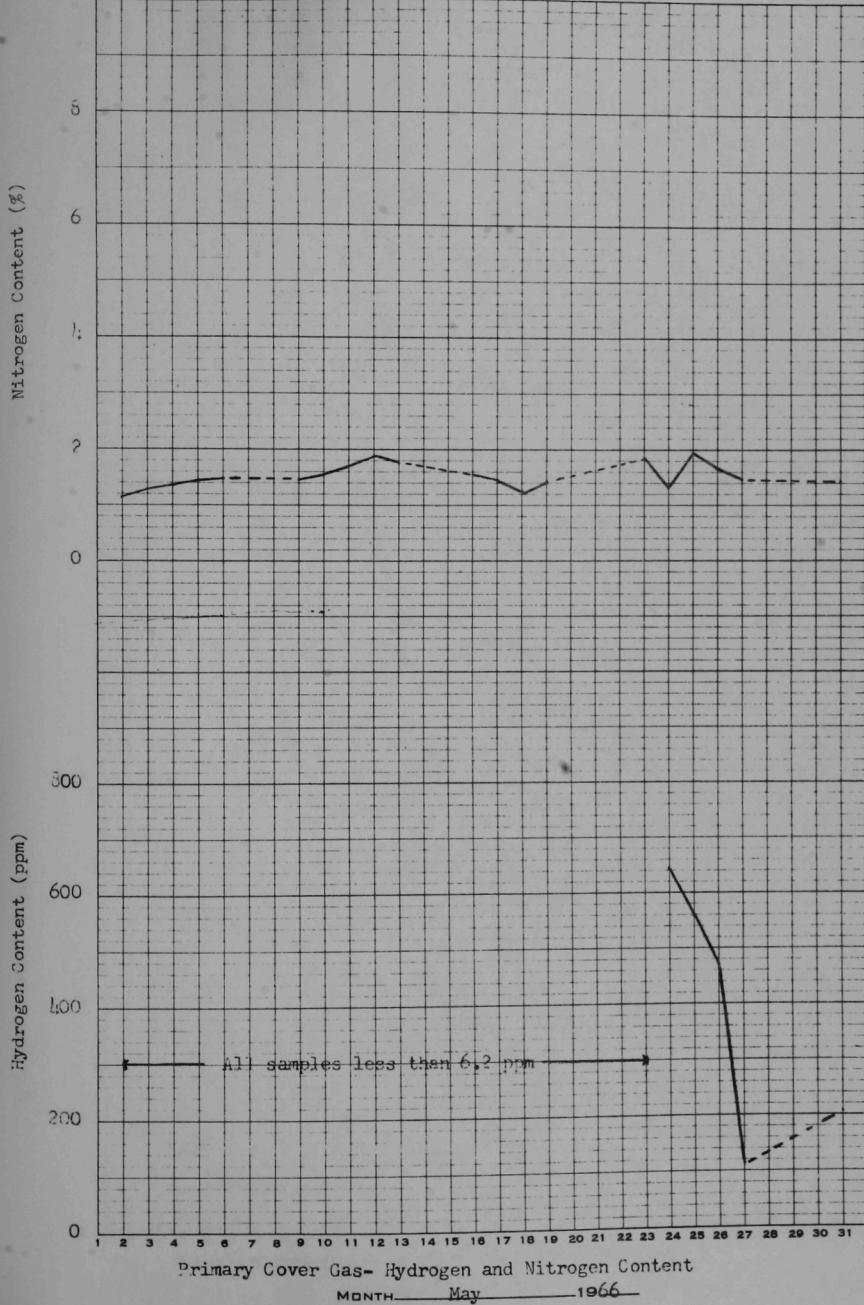


Fig. 8A



Fig. 8B



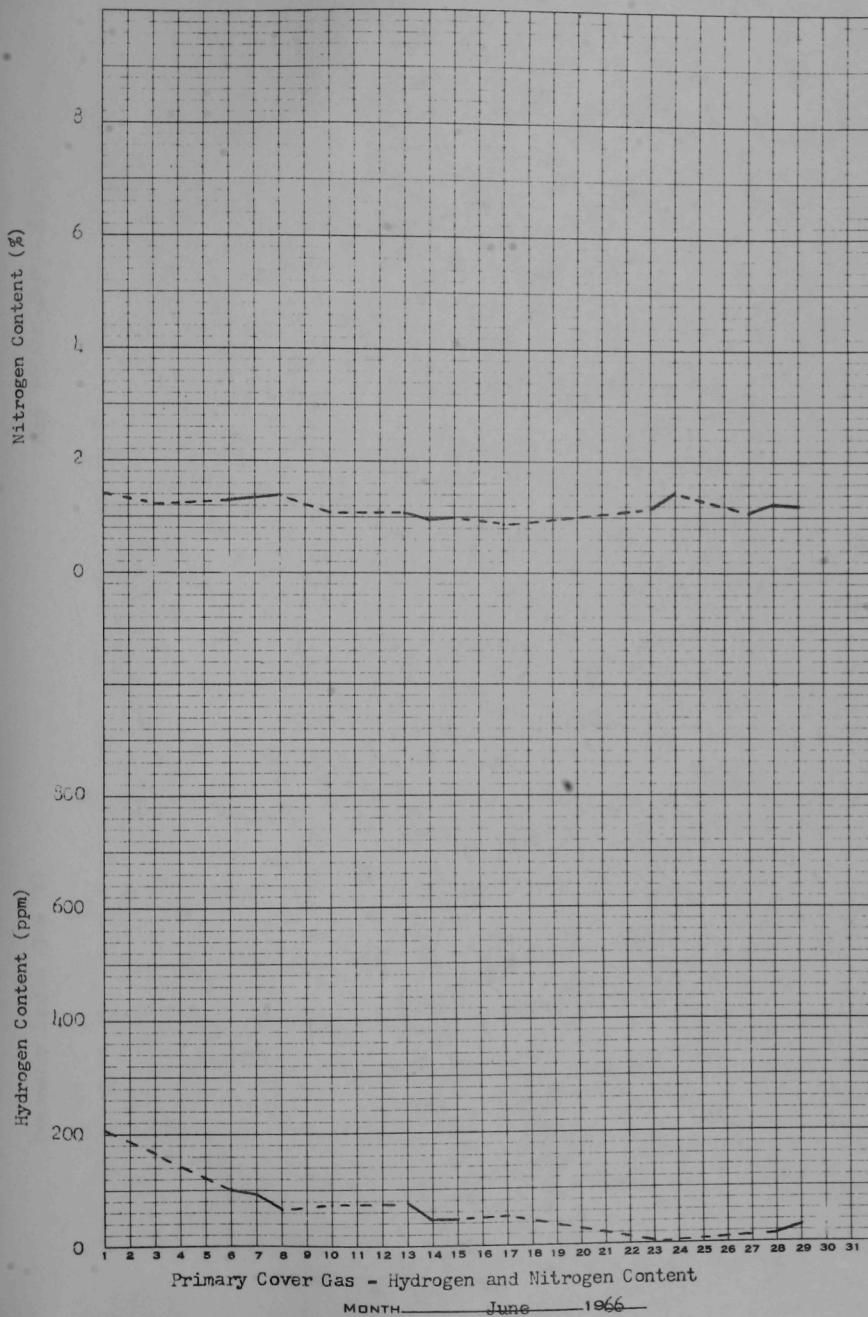


Fig. 9A

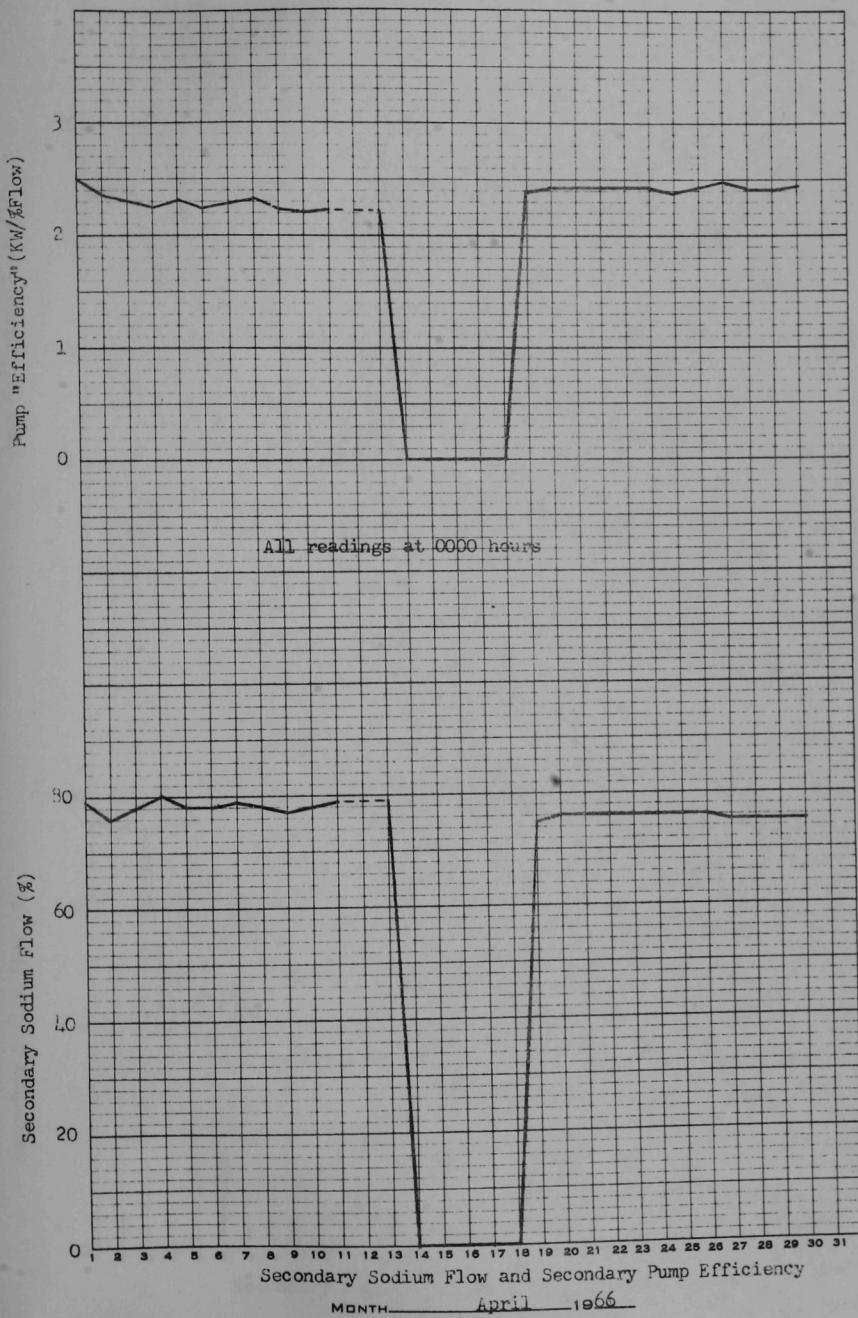


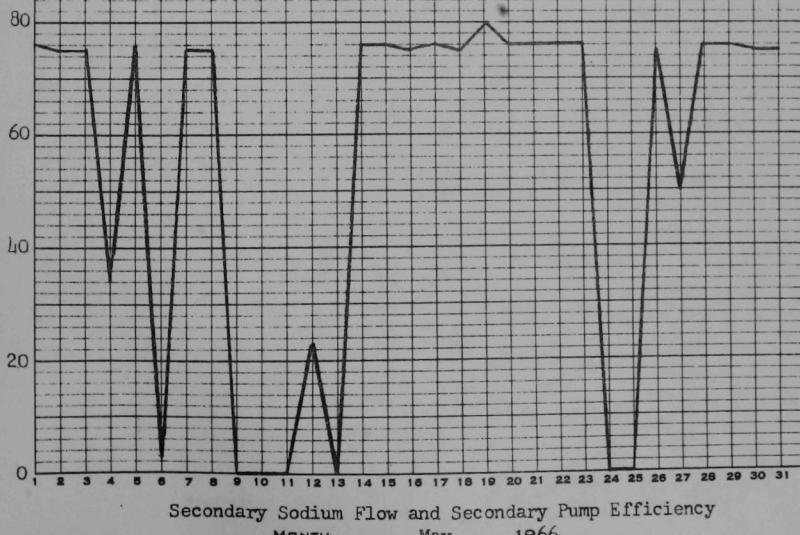
Fig. 9B

Pump "Efficiency" (Kw/£Flow)



All readings at 0000 hours

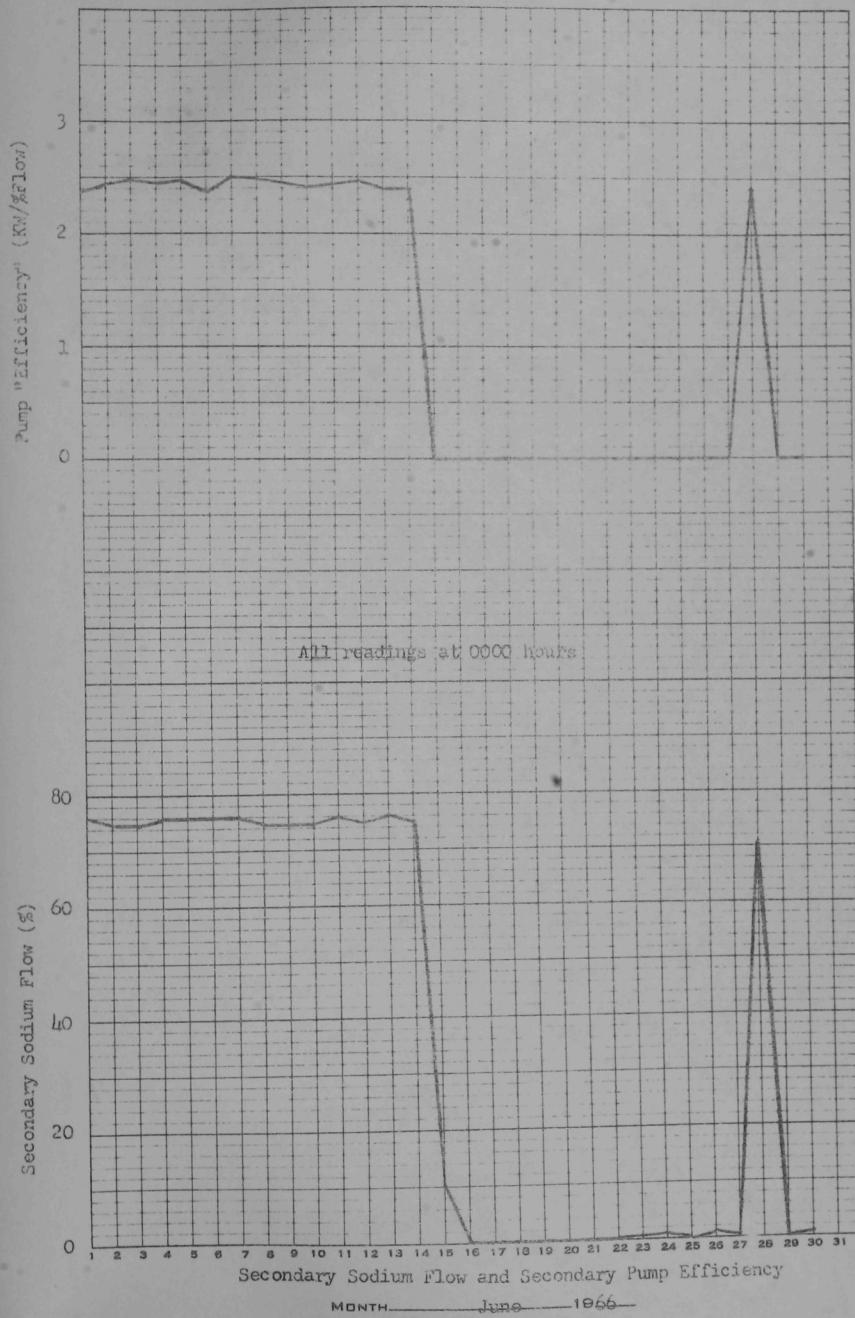
Secondary Sodium Flow (%)



Secondary Sodium Flow and Secondary Pump Efficiency

MONTH _____ May 1966

Fig. 9C



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1. Report of EBR-II Operating Data (January 1, 1966, through March 31, 1966) issued May 13, 1966
2. ANL-7204, Reactor Development Program Progress Report, April, 1966
3. ANL-7219, Reactor Development Program Progress Report, May, 1966
4. ANL-7230, Reactor Development Program Progress Report, June, 1966



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